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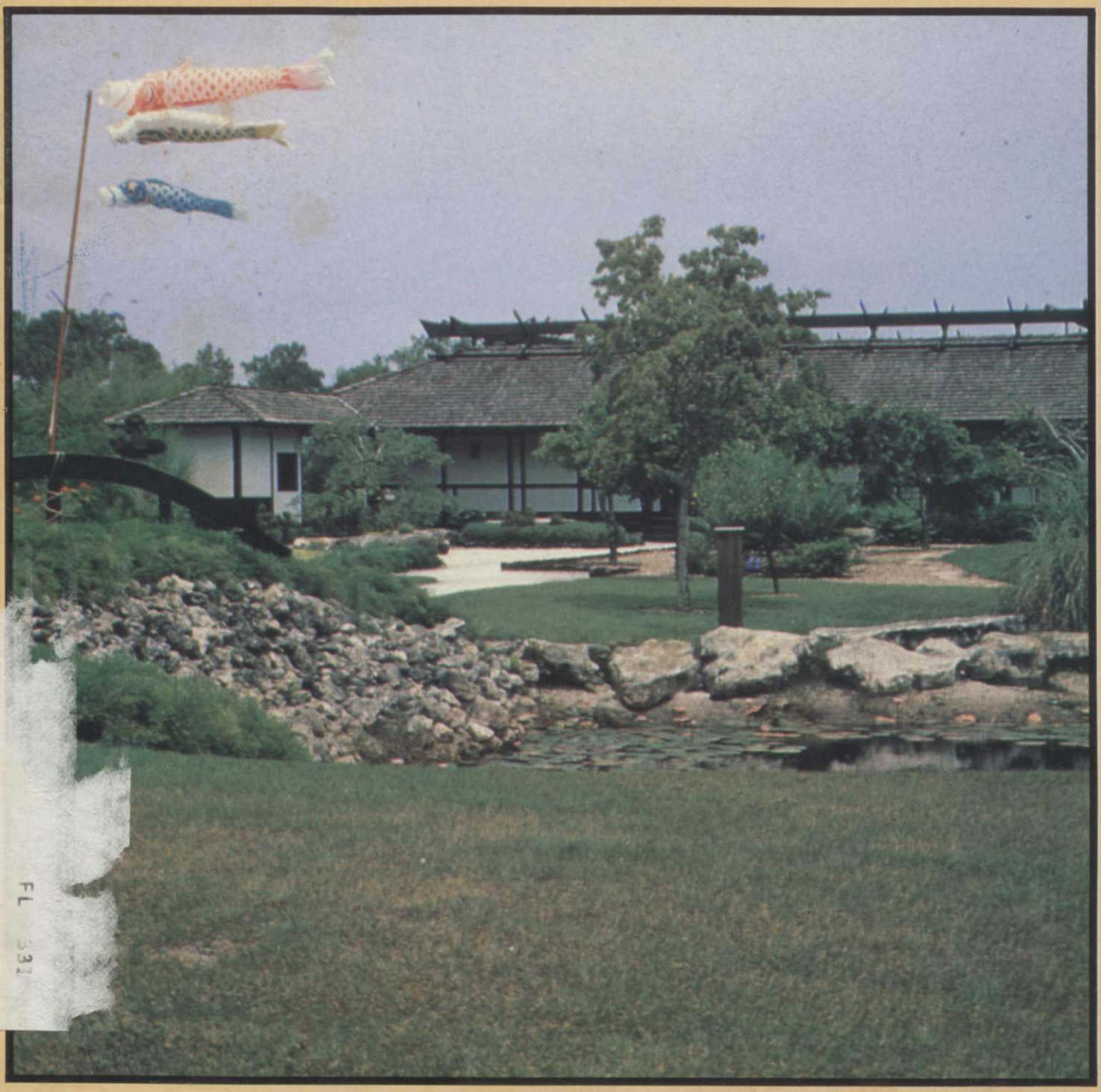

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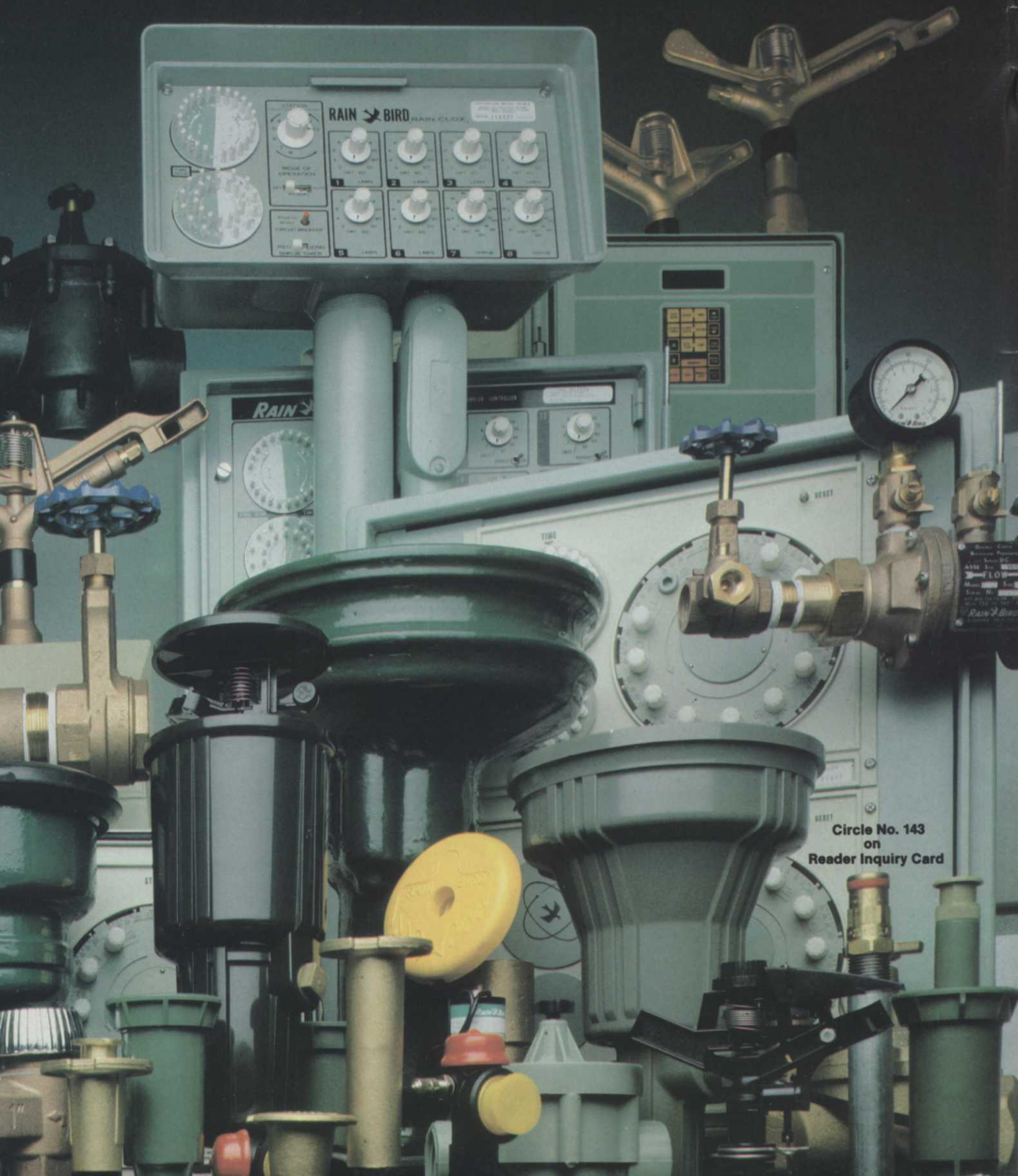

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OUTLOOK

By Bruce F. Shank, Editor

Golf Business joins WTT

Golf Business magazine is now a part of *Weeds Trees & Turf*. As one of the three top landscape markets, golf course management in many ways is the leader in technology, research and product development. We will continue to bring the latest word on golf to you.

I was a fledgling assistant editor when Harvest Publishing Company bought *Golfdom* in 1974. Bob Earley, publisher of *Lawn Care Industry*, joined us to work on *Golfdom* when we purchased it from Times Mirror. At that time, the magazine was already having problems and we tried for eight years to keep it breathing. The Golf Course Superintendents Association of America publication was stiff competition and as the market matured the viability of a privately published magazine to the golf turf market diminished.

It was not for a lack of effort or interest that *Golf Business* failed the profit test. Many of us worked extra hours to make it succeed, especially Jim Brooks who is now sales manager of *Weeds Trees & Turf*. That interest still exists but in *Weeds Trees & Turf*. A third of WT&T will be devoted to golf from now on.

At the same time, we are honing in on better editorial coverage of the landscape and public sectors, such as schools, parks, and athletic field managers. Many pleasant surprises are on their way.

This month we welcome Bill Hoffman as our Washington correspondent. Bill recently retired from the Environmental Protection Agency after 34 years of service in the government. He knows the people and the way government works. His expertise will provide an early warning system for you in regard to pending regulations and registrations. We've witnessed a number of new channels, mainly state local need registrations. Bill will follow products and regulations from the early stages of development to announcement.

We invite your questions on Federal regulations. Bill can get answers quickly and accurately. Bill's expertise is now a service to you from *Weeds Trees & Turf*. Please don't hesitate to use him for answers to your regulatory problems.

Finally, we have some new blood in New York. Tom Paciello has joined the magazine as associate editor. He is very New York, very Italian, and very energetic. Part of his job will be to travel to all parts of the country interviewing readers about their businesses, problems, needs, and successes. He is also a good photographer and well educated. Please welcome him when he calls you. You'll warm to his personality.

These are just part of the improvements planned for the magazine in the coming months. This magazine is going to be responsive to your needs. It is here to serve you, please use it. Write me at 757 Third Ave., New York, NY 10017. You'll get results!

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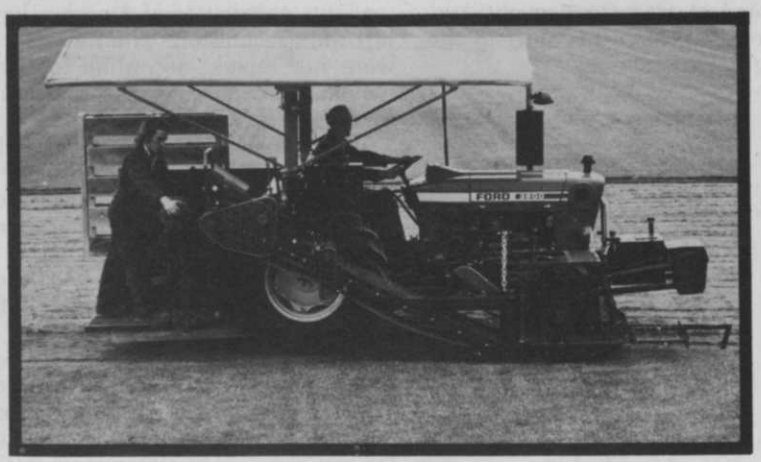

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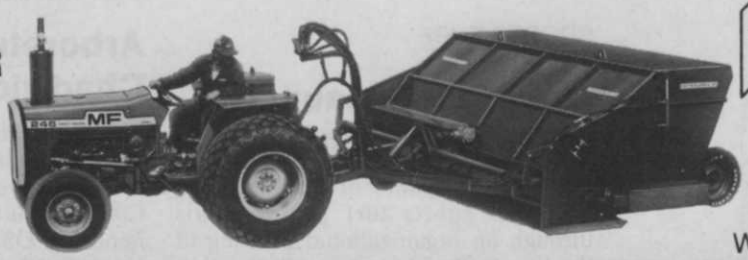

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GREEN INDUSTRY NEWS

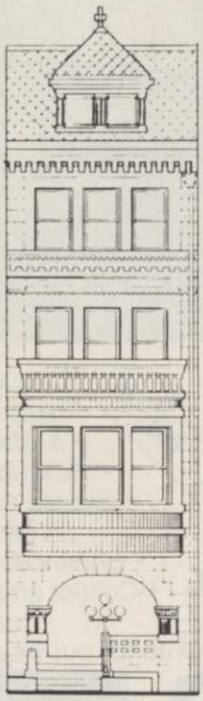
LANDSCAPE

Fire postpones move to new ASLA offices

Within two weeks of the scheduled move date, a renovated brownstone which is to be the future offices of the American Society of Landscape Architects in Washington, D.C., was damaged by fire.

The association has been carefully renovating the building to preserve woodwork, old brick, and wide staircases. Change of address notices had been mailed and the association staff was ready to move.

Fortunately, executive director Ed Able secured temporary office space in the existing building in downtown Washington until repairs could be made. Seven months is the hoped for short delay until the move to the building located at 1733 Connecticut Ave. Able hopes to have his staff in the building by December.



Future ASLA Headquarters being renovated for the second time after a fire gutted the lower floors one week prior to occupancy.

ASLA hopes to have the building back in shape for viewing by members during its annual meeting in Washington Nov. 22-25. More than $145,000 of a $400,000 goal for building fund pledges has been received.

"Nearly all the building will have to be reconstructed," said Able. "About 90 percent of the lobby woodwork will have to be replaced from the first floor down, and will match the existing woodwork above the first floor. Design-wise, the building will be the same."

GOLF

Editor, training director leave GCSAA staff

Dick Hale, editor of *Golf Course Management*, and Palmer Maples, training director for the Golf Course Superintendents Association of America, have left the association. The departures were not related according to Larry Goldsmith, manager-informational services.

Zahid Ikbal, a former member of the Kansas City Star staff and instructor at Kansas University, is the new editor. No major changes in the magazine's content or direction are expected.

An announcement is expected soon on Palmers Maples' replacement. Maples was acting executive director of the association after Conrad Sheetz left and before James McLoughlin took over. The director of training controls perhaps the largest training program for golf course superintendents in the country.

SPORTS TURF

Organization launched at Midwest Conference

Dr. William Daniel of Purdue led a group of sports turf professionals through an organizational meeting of the Sports Turf Managers Association during the Midwest Turf Conference this spring. The new group will be managed by Eric Madisen of Appleton, Wisconsin, who also manages the National Institute on Park and Grounds Management and publishes Park Maintenance.

The association intends to hold a concurrent conference with the 11th NIPGM conference Nov. 1-6 in Kansas City, Missouri. Dues will be $30 per year. Membership is open to professionals who are in charge of stadiums, college level sports areas, secondary school sports areas and others managing industrial and private sports areas.

Richard Ericson of Bloomington, Minnesota was elected president; Harry Gill of Milwaukee vice president; and Dan Weisenberger of W. Lafayette, Indiana, treasurer.

The goals of the association are to unite those persons engaged in the construction and maintenance of athletic turf areas for better playing conditions; to promote the interchange of ideas among members and other organizations; and to encourage the dissemination of scientific and practical knowledge.

HORTICULTURE

Arboretum honoring Chadwick is dedicated

The Ohio State University Board of Trustees dedicated in May a two-and-one-half acre horticultural garden in Columbus as the Chadwick Arboretum honoring OSU professor and author Lewis C. Chadwick.

Chadwick, who retired in 1967, has contributed a tremendous deal to the field of horticulture in 38 years of teaching and writing. Many leading

Continues on page 8

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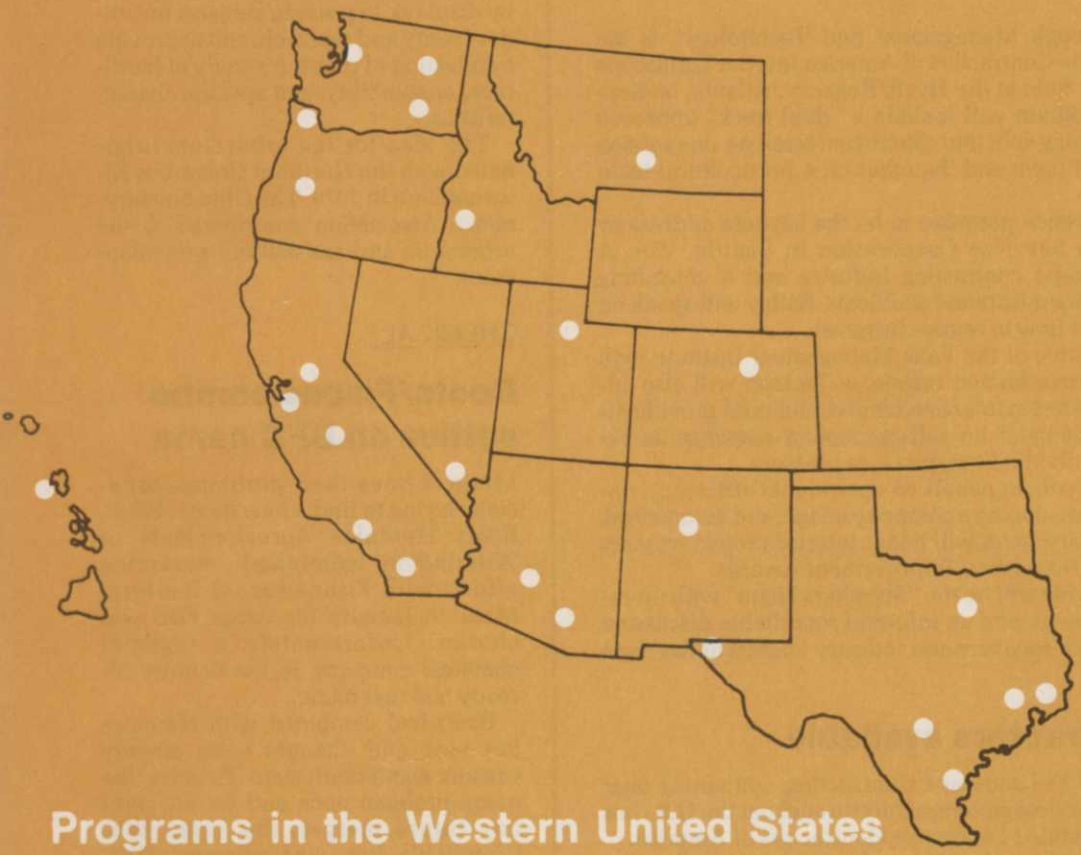

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LANDSCAPE CONTRACTOR NEWS

ALCA's ILD Conference to Emphasize Management

"Professional Growth through Management and Technology" is the theme of the 1981 Landscape Contractors of America Interior Landscape Division Conference, to be held at the Hyatt/Regency, Atlanta, on September 9-12, 1981. The program will include a "dual track" approach with much of the programming split into concurrent sessions, one session on a business management topic and the other on a horticultural technical subject.

A highlight of the conference promises to be the keynote address by Rod Bailey of Evergreen Services Corporation in Seattle, WA. A professional in the landscape contracting industry and a consulting professional to firms with organizational problems, Bailey will speak on personnel management and how to reduce turnover.

I.J. Jackson, a representative of the Fails Management Institute, will speak on strategies to improve human resources. Jackson will also administer the D.I.S.C. Profile test to interested individuals and provide direct feedback to each participant on self-perception response as expected by others and the individual's response to pressure.

Other experts will participate in panels on operational efficiency, developing a lease program, developing a company image, and automation. The Awards Presentation Luncheon will honor interior project winners of ALCA's 11th annual Environmental Improvement Awards.

Other Convention highlights will be the "Suppliers Night" with up-to-date information on equipment, and an informal roundtable discussion program with the conference speakers and industry leaders at the close of the conference.

Directory of contractors available

The *1981/1982 Who's Who in Landscape Contracting*, containing over 900 listings of commercial landscape contractors throughout the U.S., has been published by the Associated Landscape Contractors of America.

The directory lists the members of ALCA and provides the full name, address, and phone number for each contractor, as well as the name of the principle contact person. Each listing also contains a size index and the specialties for that contractor.

To recieve the directory, send $3 to ALCA Publications, 1750 Old Meadow Road, McLean, VA 22102.

Housing Starts Continue Slide

Landscapers and other businessmen affected by the housing industry are distressed that the number of housing starts continues to fall. After rising to an annual rate of 1.66 million starts in the construction of homes and apartments in January, housing starts plunged to an annual rate of 1.15 million units in May. This is the lowest level since the 938,000 starts of May, 1980, when the 1980 recession was in full swing.

"It's unquestionably interest rates," says Adren Cooper, a Commerce Department analyst. Although they have declined somewhat since then, mortgage rates were averaging a near-record 16.1 percent in early May.

"While the immediate future of the housing industry is not rosy," according to Commerce Secretary Malcolm Baldridge, "we are seeing some initial decline in inflation, and more recently in interest rates.

"If we can achieve lasting relief from inflation, then interest rates will come down," Baldridge added. "In this case, the next housing recovery could be more lasting than the recent one."

News *from page 6*

horticulturists of today were Chadwick's students. Some tree names carry the name "Chadwicki" having been selected by the professor.

The goals of the arboretum is to provide the place to expand on the number of improved landscape plants; to acquaint the public with landscape plants by displays; to provide subjects for student study and research; and to provide a collection of plants for study of hardiness, adaptability, and specific characteristics.

The idea for the arboretum originated with the Northern Columbus Kiwanis Club in 1979. The Ohio Nurserymen's Association contributed to the arboretum and assisted in its development.

CHEMICAL

Boots/Fisons combo settles on BFC name

Mergers have their problems, especially trying to find a new name. When Boots Hercules Agrochemicals of Wilmington combined marketing efforts with Fisons Inc. of Bedford, Mass. in January the name FBC was chosen. Unfortunately a regional chemical company in the country already had that name.

Boots had combined with Hercules last year and changes were already causing some confusion. To solve the name problem once and for all, until any future merger, the name BFC Chemicals Inc. was selected. BFC officials have their fingers crossed that they can take this name as their own and stop the series of changes.

URBAN HORTICULTURE

NY Botanical Garden plans futuristic thrust

The New York Botanical Garden has announced its plans to create three new "institutes" to apply botany and horticulture to problems of the present and future. The primary function of the Garden has been to serve scientists with the leading collection of plant information for reference and identification.

The three institutes are the Institute of Ecology, the Institute of Economic Botany, and the Institute of Urban Horticulture. The first will approach environmental deterioration and the role of plants. The second will deal with expanding the number of economically

News *from page 8*

significant plants for food. The Institute of Urban Horticulture will study and develop plants which can withstand pollution and other environment threats such as disease and insects. Horticulturists, plant pathologists, landscape architects and urban planners will play a part in this institute.

The Garden hopes to use its various facilities located in the New York City area to develop the information for application in problems of today and tomorrow.

LANDSCAPING

Nurserymen advise on energy savings

The proper use of landscape materials—including trees, shrubs, ground cover, grass, earth, fences, walls, and surface materials such as paving, brick, and gravel—can help you modify the air temperature, solar radiation, wind, and humidity that affect a home, says James Hayward, horticulturist and executive secretary of the Illinois State Nurserymen's Association.

For example, the shaded area under a tree is from 15 to 25 degrees lower than the surrounding unshaded area, which means that a home in the shaded area will be cooler in the summer.

A row of evergreens planted as a windbreak can reduce wind velocity up to 20 percent, providing a zone of protection 15 to 20 times the height of the plants, and thus protect the home against heat loss from the wind in winter.

The following guidelines prepared by William Nelson Jr., extension landscape architect at the University of Illinois, can be used in planning the energy-efficient landscape:

1. The west wall of the home will benefit most from shading against the summer sun. If there is space for only one tree, place it up to 25 feet from the house where it will shade the west wall from 3 to 5 p.m., when the sun's heating effect is greatest. If there is room for a second tree, put it where it will shade the south end of the west wall from 1 to 2 p.m., as close as 15 feet from the house.

2. Shade is generally not necessary on the east wall, unless there are large glass areas that catch the morning sun. If shade is needed, a tree can be planted to shade the south end of the east wall at the 11 a.m. sun angle.

3. Because the summer sun is at its highest at mid-day, the shadow it casts

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GOVERNMENT UPDATE

by William Hoffman

Supreme Court Upholds Surface Mine Act

The decade-old battle over federal strip mining regulation took yet another complex twist in June. On June 15, the Supreme Court unanimously upheld the constitutionality of the four-year-old Surface Mining Control and Reclamation Act.

The Act, enacted after a nine year battle in Congress, called for the Federal Government to enforce the law in the "interim" phase, with the states eventually enforcing the law in the "permanent" phase, once they had developed acceptable programs.

Mine owners, mining industry groups and the Virginia and Indiana governments challenged Congress' right to impose stringent environmental regulations on unwilling states and property owners. Lower Federal courts in Virginia and Indiana found the act unconstitutional, but the Supreme Court held that the 10th Amendment does not bar Congressional regulation of strip mining.

The Court's decision was particularly distressing for James Watt, the Secretary of the Interior. Under Watt's predecessor, the Interior Department had appealed the lower courts' ruling, while Watt had filed a brief on the coal mining operators' behalf. Before the decision was announced, Watt told the National Coal Association that the Office of Surface Mining had to be reorganized because it contained "every abuse of government." He added: "what a shame, what a shame. I promise you it will be changed."

The Interior Department had no comment on the government's unwelcome legal victory.

Federal Plant Care In-House Only

In 1979, Senator James Sasser, Tennessee, upon learning that the General Services Administration (GSA) was contracting for professional services to care for the plants in the Federal Government offices, championed a bill that would eliminate this practice and save the taxpayer's money — $251,000 in 1977, $181,000 in 1978 and $157,000 in 1979.

Now GSA has its own four member gardening staff watering, spraying and feeding 3,688 tropical plants in 32 different agencies in the Washington, D.C. area. They work from 2 A.M. until mid-morning and are paid $13.24 an hour. A fifth person will be needed next year.

The cost for 1980 was about $243,600 or about $60,000 a year more than the professional plant care services charged. GSA estimates that contracting would save about 20 cents per plant per month.

It appears that the Sasser plant bill has added to the national debt. This does not consider the cost of two separate General Accounting Office (Congress' watchdog) reports on plant conditions in the Federal offices.

Where were most of the tropical plants? In 1977, they were in the Department of Interior, Department of Energy, the Veterans Administration, the Environmental Protection Agency and the Department of Agriculture.

Cathey to Direct National Arboretum

Henry Marc Cathey was recently named director of the U.S. National Arboretum in Washington, D.C. Dr. Cathey started with the USDA in Beltsville, Maryland, in 1956 where he did research on the interrelations of light, temperature and chemicals in the growth, flowering and production fo florist and nursery plants. Since 1972 he has been chief of the Florist and Nursery Crop Laboratory at Beltsville.

The National Arboretum, established in 1927 and one of the world's great arboretums, is a research and educational institution with an active and acclaimed staff of horticultural scientists. Among the outstanding attractions are the new National Herb Garden, the National Bonsai collection, the Gotelli collection of dwarf and slow-growing confiers, azaleas, crabapples, dogwoods and magnolias, and the community youth gardens.

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NINE-HOLE GOLF COURSES: SERVING THEIR PURPOSE

By Joe Much, NW Director, National Golf Foundation

Just as supermarkets sent corner grocery stores into obsolescence nearly four decades ago, development of multiple-course golf operations and the expansion of scores of shorter courses to 18-hole dimensions yearly is threatening to put nine-hole golf courses "out to pasture," where many were built in the first place.

But it would be premature to suggest obsolescence for nine-holers, which still number 5,993 in America, including 4,749 of regulation length, according to the National Golf Foundation's inventory. While that figure does not account for half of all golf courses, as nine-hole layouts did just a few years ago, it does represent some 47 percent. And it is unlikely expansion programs will reduce that percentage by more than a few points each year.

Thousands of Americans call nine-hole courses their golfing homes and, for many of them, nine holes constitute a complete round of golf. In 21 states, nine-hole regulation courses outnumber those of 18 holes or more, sometimes most dramatically. North Dakota, for example, has 80 nines compared to only 13 full-length courses. In South Dakota the difference is 81 and 15, in Maine 75-25, Arkansas 79-58, Oklahoma 93-66, Nebraska 111-33, and in Iowa an astonishing 252-69.

Even those states with a preponderance of full-length courses also have an abundance of nine-hole regulation facilities. New York lists 252, Michigan 243, and Texas 276.

What constitutes a "round" of golf depends upon the preference of the player or whoever is counting. While 18 holes are generally recognized as a full round, it is probable that the majority of golf exercises recorded on weekdays on all courses across the country are nine-hole rounds. Many golfers will play on a long lunch break or rush out for nine after the evening meal. Most league play is geared for nine holes as are men's and women's day events.

Some busy nine-hole courses actually try to discourage 18-hole play by offering no reduced rate for a second trip around the course. The same courses sometimes make little or no provision for working players making the turn into the first tee schedule during busy times, preferring to get as many new players started as possible. While this is not recommended as good business practice, it reflects the attitude of some nine-hole course owners regarding what constitutes a round of golf on their layout.

Boon To the "Boondocks"

Obviously, there are thousands of communities in the country to which golf would be nothing more than a television show, a newspaper article or just a rumor if it were not for nine-hole golf courses.

National Golf Foundation feasibility guidelines call for at least 25,000 population to support a public 18-hole facility, and as much as 50,000 when that facility is expected to shoulder a large debt service on opening. Smaller population areas simply have to settle for nine holes or nothing.

Fortunately, it does not require half that much population to support a nine-hole facility. It requires just enough interested people to provide the funds for securing 50 or more acres; building the course (sometimes for $200,000 or less when volunteer labor and donated materials are used); and maintaining the course once it is in play, on an annual budget of as little as $40,000 in some cases.

Farmers Home Administration encouragement and guaranteed loans to organizations in rural communities were instrumental in adding over 600 golf courses to the American landscape in the 1960's. The vast majority of these were nine-holers, all built in towns of 5,500 population or less, often much less.

The golfers they produced by the thousands, coaxing them off farms and out of village shops and the schools, are not the most sophisticated in the world. But nobody will convince them it takes 18 holes to make a golf course or a round of golf.

In many parts of the country, the nine-hole municipal course is a golfing staple. This is particularly true in the Midwest, where 263 of the 609 regulation municipals in a 12-state area are nine-hole courses, and in the Mountain States, where 96 of 188 are nines. Like the FmHA-backed community club courses, most of these are situated in rural communities or small cities.

There are, however, many nine-hole courses in urban settings. Some of them are par-3 or middle-length adjuncts to 18-hole regulation courses and, as such, are popular with women, seniors and beginners. Most are independent, regulation daily fee facilities which comprise the largest single category of nines, the mom-and-pop or family-owned and operated golf course.

Most of them fit neatly into the marketplace, providing a supplement or alternative to other, fuller facilities. While they may not appeal to all golfers all the time, they are particularly popular with juniors, women and seniors. They are generally recognized as excellent training grounds for the less skilled.

Many persons who fall into these golfing cate-

gories feel less than comfortable at a busy 18-hole course where more serious golfers are trying to move around at a good pace. They prefer to do their learning at a shorter course where pressures are not so great.

A survey of nine-hole municipals in 1979 showed that 19 percent of the play on the average was by women and 13 percent by juniors. Those figures were greater by four and three percent respectively than those recorded for 18-hole municipals in the survey.

Popular Proving Grounds

Nine-hole courses are doing as much or more to launch new golfers into the game as the nation's 18's. And while many nine-hole courses simply do not generate enough traffic to provide a suitable financial opportunity for a PGA professional, many can offer a good teaching pro a steady, rewarding job. Depending upon the type—private, daily fee or municipal—between 35 and 50 percent of the nines employ pros.

The young professional who logs learning time at a nine-hole course, where some of the problems are halved but many others doubled, will gain experience that will serve him well through his career. This portion of his career probably should be his first head professional position. If he can be an effective promoter of the game, his merchandise and his personal services among the less sophisticated golfers who normally frequent nine-hole courses, then his future in golf is assured. And once he has moved up, he can feel a sense of satisfaction in having served his time at the grass-roots level of the game.

Recent surveys have shown that from 50 percent to 65 percent of the nine-hole courses in various categories employ a golf course superintendent. Here again, the shorter course, usually operating with a shorter staff and tighter budget, offers an excellent training ground for young men interested in turfgrass management. Many of the most successful superintendents in the profession today can look back to apprenticeships at nine-hole courses, either as laborers, summer help, or simply as neophyte superintendents.

Is a nine-hole golf course a good business? It is difficult to answer that question in today's

Continues on page 16

economy. Land and development costs are so great that the prospective golf course owner/operator likely could find a more profitable place to invest his money. However, such golf course brokers as the McKay Realty Co. of Lansing, MI, and the William Sherman Co. of San Rafael, CA, often list bargains in fine nine-hole golf facilities which are much more economical to purchase already built than to build from raw ground. These may not always be sensationally successful properties, but they offer the enterprising would-be golf operator the chance to launch his own business within his means.

Nine-hole golf courses are also available for lease from time to time from such sources as municipalities, real estate developers, or owners who are simply weary of the daily grind. Probably no other avenue to an initial venture in golf course operations, particularly for the untrained, is more advantageous than the leasing of a good nine-hole course. The painful apprenticeship can be completed without major investment.

Rounds of Play Key to Success

Well located and efficiently run, a nine-hole golf course probably will turn an operating profit, but the golf course owner trying to retire a large mortgage could find himself in trouble. It is possible for a busy nine-hole course to generate up to 40,000 rounds annually, although most do not. The 1979 municipal survey showed a national average of 25,000 rounds for nine-hole courses. A 1980 sampling of daily fee nines showed a wide range from 4,000 to 38,000 rounds with a median of 13,500.

Like the golf business anywhere, rounds of play represent the fundamental factor in generating revenue. Added income from such sources as golf car rentals, driving range balls, merchandise sales, restaurant and bar business, etc., obviously will vary with the nature and scope of the facility. But it is the rare golf course of any size which will succeed without a good, predictable volume of play.

For those who would build nine-hole courses from scratch, the cost will vary from region to region and, indeed, from site to site and will continue to escalate. Excluding land costs, a good target figure for construction of the golf course alone might be $300,000 in the early 80's. This should include a partially automated irrigation system, greens averaging 6,000 square feet and built to reasonably strict specifications, a minimum of bunkering and perhaps a pond or two. Obviously, cost can vary either way, depending upon the nature of the site, architectural features and construction methods.

Developers of real estate projects generally have regarded nine-hole regulation courses as a last choice in golf facilities. Where it is economically feasible, they prefer to build the 18-hole regulation course, which offers maximum fairway frontage and increases lot costs. For the same reason, many developers have opted for 18-hole executive golf instead of regulation nines when shown that roughly the same amount of land would be used.

As land becomes increasingly expensive and as the trend to more diversified recreational amenities in planned communities, such as tennis and racquetball courts, bicycle and jogging paths, continues, developers may take another look at regulation nines.

Another attraction of the nine-hole course for land developers is the reduced construction cost, smaller maintenance expense, and reduced personnel requirements. Most real estate developers would rather not be in the golf business at all and a reduction in involvement is desirable.

Advantages and Disadvantages

Subjects of an owners' survey several years ago were asked to list advantages and disadvantages of nine-hole golf operations. Only the philosophers among them could find advantages, but in the grand old American tradition, almost everyone found something to complain about.

The most frequently expressed complaint was the difficulty of working in players starting their second nine holes with those beginning play. This can create confusion at the first tee and, when now successfully carried off, cause friction among players. Course operators also lament the difficulty of offering preferred starting times because of problems at the turn.

Nine-hole courses in a competitive location, one operator said, find it nearly impossible to compete on weekends with 18-hole courses, especially if the nine is situated some distance from the population center.

Slow play is a curse on any course, but can be particularly damaging on a nine-hole layout when players waiting to start are stacked up with others making the turn.

Properly regulated play on an 18-hole course can accommodate more than 300 players on a busy day in season. Nine-hole courses are crowded with anything over 150 if many are playing 18 holes.

These same problems, along with the natural preferences of serious golfers, limit the possibilities for nine-hole courses to host tournaments and realize the revenue of group outings. Restricted revenue, one owner said, prevented him from securing the services of a competent, full-time professional.

There are systems that will minimize the crossover problem at the first tee while maximizing the number of players who can be accommodated on a single day.

Some years ago in connection with its Speedy

Continues on page 18

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Nine-Hole *from page 16*

Golf program, the NGF offered a tee-off schedule for a nine-hole course. It involved the use of the first and fifth tees for the first hour of the day and the closing of the course to additional players for two intervals during the day. Faithfully followed, the system could put as many as 216 golfers around a nine-hole course in 18-hole rounds on a single day.

Obviously, this system would be used only in crush situations such as tournaments or company outings. Other modified systems can alleviate problems on normal days, and strict adherence to reserved starting times will help accommodate all the golfers who wish to play most nine-hole courses.

Imaginative operators can do much to increase the appeal of their courses, even for those golfers who insist upon the challenge of 18 different holes. Many of them provide dual tees or tee settings to change the distances and sometimes the character of the holes from one round to the next. In rare cases, dual pins are used and color-coded for further variety when greens are large enough to permit.

The pro-manager of a Colorado course that has recorded as many as 35,000 nine-hole rounds in a season finds that "keeping most activities of the facility under one manager or professional not only saves money but enables us to treat the public on a friendly, consistent basis.

"In a metropolitan area," he said, "a regulation public nine is hard-pressed to compete with surrounding 18 or 27-hole courses, but good greens care and friendly management are our equalizers."

Nines Have a Future

The future of the nine-hole golf course probably is not far from where its past has been—in the small communities of America. When the FmHA program of assistance to rural area clubs was in force, the 600 courses it helped develop really just scratched the surface. Thousands of other small towns in the country are still without golf courses to call their own. When they get around to building them, chances are most will be nine-hole tracks, at least for the first several years.

Of the 58 new regulation courses opened in America in 1980, 26 were nine-holers. So were all four new executives and five of the six par-3's. Among new courses going into construction the same year, 17 of 53 regulations were of the nine-hole variety, four of six executives and the only par-3 listed.

Meanwhile, additions to existing facilities continue to play a large role in golf course development. There were 64 in 1980, of which 53 were of nine holes, usually to create an 18-hole course. At any given time, at least half the nine-hole golf owners questioned will express aspirations for expanding their facilities. **WTT**

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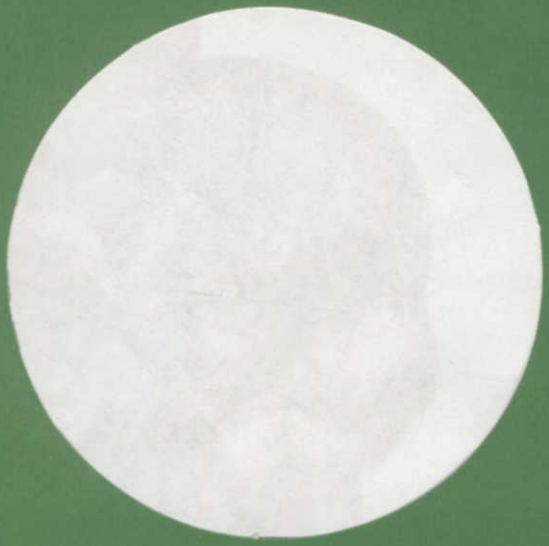

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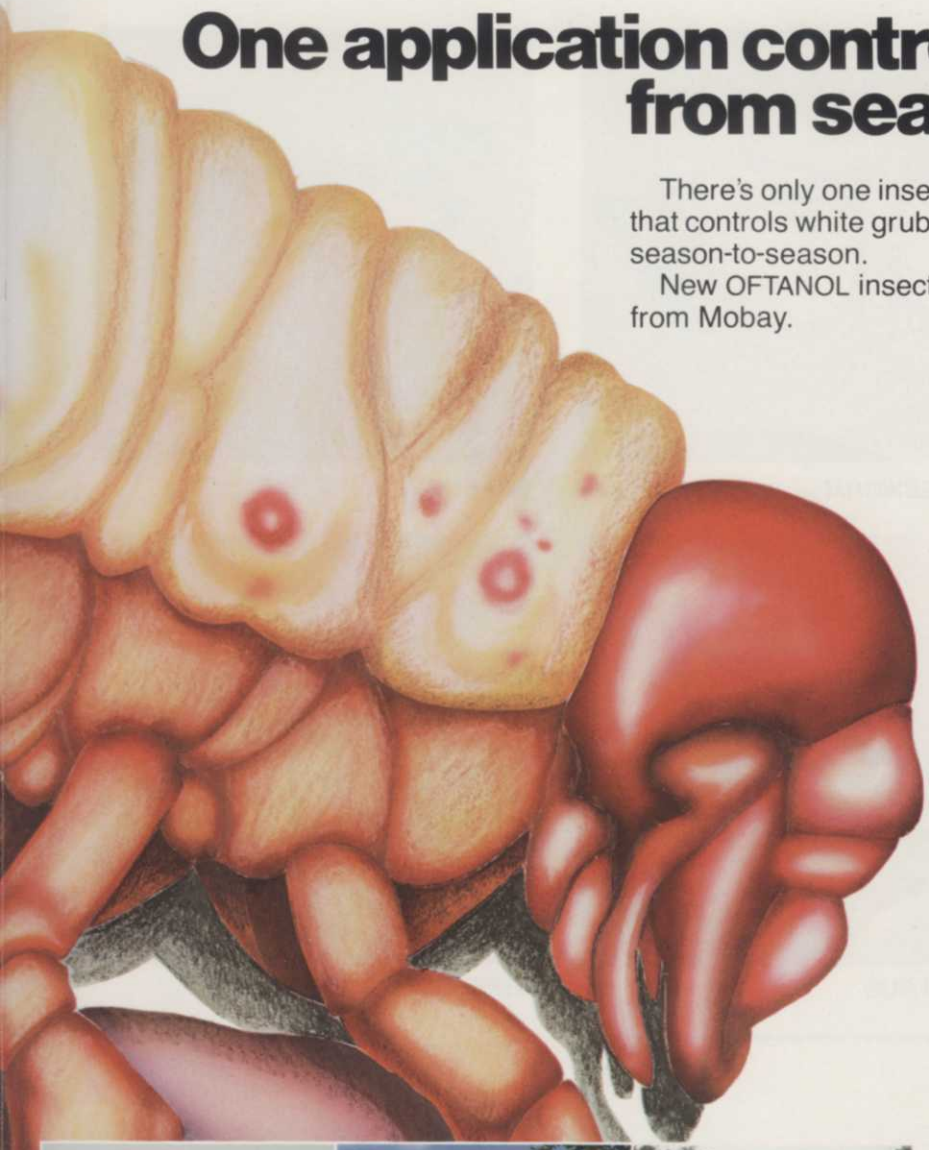

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CO-OPING LANDSCAPE STUDENTS PUT EDUCATION INTO ACTION

By Gil Troy, editorial assistant

Managers of Green Industry businesses, although focused on different aspects of landscape preparation and management, share common complaints. Government regulation, inflation, personnel management, and misunderstanding of their work all contribute to the headache and heartache about which managers commiserate. For those who hire college students, there is a common statement to express disdain: "Those smart-assed kids don't know how to work."

Unfair as it is to fresh graduates, this reaction is often justified. They are filled with horticultural intellectualism and microeconomic theories, but act clumsily with a pruner, edger, or set of design prints in their hands. They can't learn everything in college, but they need basic skills to immediately apply to a job. In the summer when they often begin a new or first landscaping job, supervisors are too busy to teach every aspect of the job. Grads may see this lack of help as impatience or disgust. The supervisor says, "another damn college kid."

To cope with this frustration between the manager and college graduate employees, the Associated Landscape Contractors of America (ALCA) worked with the faculty at Mississippi State University to develop a program of cooperative education similar to the type engineering and other academic disciplines had been successfully using for years. Together, the school and professional association developed a model curriculum, which is now used as a base to help other schools with curriculums in landscape contracting. Mississippi State also has a landscape architecture co-op program. Faculty, students, and employers of firms that hire Mississippi State's co-ops laud the program without reservation. "We're marrying theory and reality," says Bob Callaway, assistant professor of landscape architecture.

Co-op Programs

Cooperative education began in 1906, but has only recently become available for landscape majors. Today, 54 of the 165 landscape majors at Mississippi State, almost one third of the entire department, are in the co-op program. The program takes four and a half to five years to complete. The academic year is divided into three semesters—fall, spring, and summer. The student alternates a semester of school with a semester of work. Upon graduating, the student will have worked for three to six semesters, or for one to two calendar years with his co-op employer.

Students are normally employed in pairs, with one working while an alternate studies on campus. Most Mississippi State students are employed by design/build firms and government agencies. Employment with more landscape architecture firms is being sought.

Mississippi State students in landscape architecture apply what they have learned in the field to designs.

During the work period, the student is evaluated by his employer. The evaluation carries comparable weight to the student's academic marks in assessing his college performance. "The monitoring works extremely well," according to Len Spencer, president of the Spencer Co. in Houston. "The school gets a commitment from the students and holds them to it." Spencer's division managers do the grading, "because they associate with the students the most."

The phenomenal success of Mississippi State inspired the development of a co-op program at Ohio State University. The program is two years old. Last year two students were involved, but this year, explains Assistant Professor James Hiss, the co-op coordinator, after a "heavy-duty sales pitch at the ALCA convention in New Orleans," they placed 14 students in a "variety of firms."

Ohio State is on the quarter system. The students work the summer after their sophomore year, the spring and summer of their junior year, and the summer and fall of their senior year. They graduate in five years with one-and-a-half years' experience.

The Ohio State program, like the Mississippi State program, is trying to expand placement opportunities for landscape architecture students.

Continues on page 25

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Professor Hiss explains that, presently, "most landscape architecture students are working with landscape contractors. It's a problem placing landscape architecture students in landscape architecture offices. Co-op is a new system of hiring. Some firms can't make a commitment, they don't know what their work will be like. Some can't fit it into their schedule of hiring and firing."

Two of the fourteen Ohio State co-ops this year are working in L.A. offices. Professor Hiss wants to use the two in L.A. offices as a starting point, and hopes to gain the confidence of landscape architects at the American Society of Landscape Architects' (ASLA) Convention. "If we can promote it enough, get enough students in L.A. offices, we'll have something to offer the industry."

● "It's the nearest thing we have to old world apprenticeships." . . . Len Spencer, president, The Spencer Co.

Although establishing the program is "very difficult" and takes a "heck of a lot of time," Hiss feels that it's worth the effort. "Most students love it. They are put to the test and are given a lot of responsibility. They return to school with a heck of a lot more confidence and are better able to put their schooling into perspective."

At California Polytechnic State University at Pomona, the co-op program has more requests from employers for co-op students than willing students. "The students don't want to interrupt their education," says Dr. William Sparks, department chairman of ornamental horticulture. "Also, at Cal Poly we have a unique program which allows students to gain experience while in school.

"The department has a retail nursery operation," Sparks explains. "The students grow and sell plants to the general public. Students can graduate with a minimum of two years experience, and they don't have to go out."

Nevertheless, about half of the 65 students who graduate from the department each year are in a co-op. Cal Poly has both alternating co-ops like Mississippi State and Ohio State, and parallel co-ops in which students work for twenty hours per week and study for twenty hours. Most students and most employers prefer the alternating co-ops. Sparks asserts that, in general, "most employers prefer a longer period of at least six months for co-op students."

Other schools that have co-op programs or provide similar opportunities to work and to study include Lake City Community College, Michigan State University, California Polytechnic State University at San Luis Obispo, New Mexico State University, Purdue University, and Texas A&M.

Schools that don't have official co-ops encourage students to seek work experiences. Jerry Walkup, assistant professor of horticulture and landscape architecture at Oklahoma State University in Stillwater, says that Oklahoma State started working toward a co-op program for landscape construction, after industry called for it. "We're not sure we can sell the program to the university or to the students. Students are not willing to give up time and stay in school longer." The department encourages summer jobs and internships on a "volunteer basis" and does grant credit for work experiences upon evaluation.

Robert Reinmann, dean of landscape architecture at Syracuse University, says that despite the fact that "students are routinely positive about their work experiences," it's just not practical for his department. There are 300 students in the program and thus "more students than there are employment opportunities," especially in the Syracuse area. Yet concern exists about the "discrepancy between the workplace and the classroom. When we don't have linkage with practicing professionals or the workplace, we get a warped sense of what preparation is needed."

Student Benefits

Co-op students have to overcome the problems of remaining an additional year in school, leaving their friends and relocating, and must find an employer who is willing to hire them. Those who surmount those obstacles support the co-op program wholeheartedly. "I was very doubtful at first," Laura Solano, a junior at Ohio State maintained. "I had been in school for so long, and I didn't want to add another year."

● "The co-op student gets an opportunity to see all the different seasons." . . . Carl McCord, president, Landscape Design and Construction, Inc.

Solano was hired by William Behnke Associates in Cleveland, and has no regrets. She's been working in Cleveland since April 1 and thinks the experience is "really marvelous. I can think of no better supplement for the education of a landscape architect. It makes you realize just what it's all about, and gives you an overview. It's a great professional and educational experience. It's especially good for a student who is doubtful about L.A. or is frustrated by school."

The "nomadic lifestyle" that comes from moving every two weeks doesn't faze Solano. "I was excited by the idea of moving to a different city, of travelling, of being independent." She says

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that other students don't go because they have other commitments or don't want to travel.

Although the professional experience is sufficient, Solano would like to see co-opers get college credit for their work. "It would help a little as incentive to join."

Co-oping is a valuable experience which can assure the competent student of a job once he graduates. Bill Dunn graduated from Mississippi State in December. In January, he joined SaBell's Inc. in Lakewood, Colorado, as a production manager. Dunn first worked for SaBell's in January of 1978, when he co-oped in the nursery for five months. In the fall of 1978 he returned and worked on a quarter of a million dollar landscaping job. In the summer of 1979, he worked as a foreman. Today, five months after graduating from college, Dunn is working in SaBell's estimating department.

● "They come here primarily as a learning experience. Students go back knowing what they don't know." . . . David Pinkus, vice president, North Haven Gardens, Inc.

"In the beginning, I was a laborer," Dunn recalls. "Once I was in a position of authority, there was some rejection at first. Experienced laborers resented this 'college kid taking over,' but once they learned to understand me, some of them became my closest friends at work.

"You're better off going back to the person you co-oped with. You've worked out many of the bugs. You graduate knowing a lot about the company, and don't have a problem getting oriented." Dunn estimates that students who co-oped start out earning $1500-$3000 more than inexperienced graduates who didn't co-op.

Although students are paid for their co-op experience, Dunn cautions that co-oping is not a money-making venture. "If you moved away from school, all you could have saved goes to travel expenses. Mississippi is not that big of a market and most students have to get away. The biggest problem for the co-op student is transportation and living arrangements."

Nevertheless, the benefits outweigh the inconveniences. Co-oping, says Dunn, "lets you get some experience and find out what you want to do. You discover any adjustments in your curriculum you want to make. It makes you realize early on whether you like landscaping or not. I'd rather have somebody come sophomore year to work and then drop out, than have him suffer through school for four years."

Those students who do drop out of the co-op, but remain in landscaping, leave either because of the company or for personal reasons. Dunn guesses that "about half didn't like the way the company is run; they just couldn't put up with it. The other half decided they didn't want to be away from home, from their girl friends, or from the lush landscape of Mississippi."

Industry Benefits

Employers who hire co-op students are not merely getting cheap labor. Students are recruited by mail, by visits to the campus, and by contacts made at trade conventions. Each company is responsible for designing some type of training program for the students. This program should allow the student to work in his chosen field and to progress as his skills improve.

A special training program was developed at Theodore Brickman Co. in Long Grove, Illinois, with the assistance of Mississippi State. The management training program is "part of a process," according to Bruce Hunt, vice president and general manager of the company. "Students go from one department to another; they work inside and outside. They experience all phases of the business—maintenance, construction, and estimating." Both landscape architecture students and others are exposed to office routine.

"We're pretty selective in our recruiting process," says Hunt. "Unless they're pretty sharp, we won't hire them. We're looking for quality, not just labor." Hunt and his company have been "generally pretty pleased" with the eight students they presently employ from Mississippi State, Ohio State, and Michigan State, as well as the 75-100 students who have worked at the company over the past ten years.

● "An employer gets to groom a person for four years so they can fit into the organization and begin contributing upon graduation." . . . Mike McMurray, landscape architect, Marvin's Garden and Landscape Service.

Most firms look for quality in their co-ops, and are more concerned with their potential than their actual experience or knowledge. "The students come here primarily as a learning experience," explains David Pinkus, vice president of North Haven Garden Inc. in Dallas. "We don't expect them to know a heck of a lot. Sometimes, we're surprised when they know something.

"Students go back knowing what they don't know," says Pinkus. "If you think you know it all, you're really in trouble. Experience shows you what you really need to be more concerned with. You hear a professor say something, or you read it

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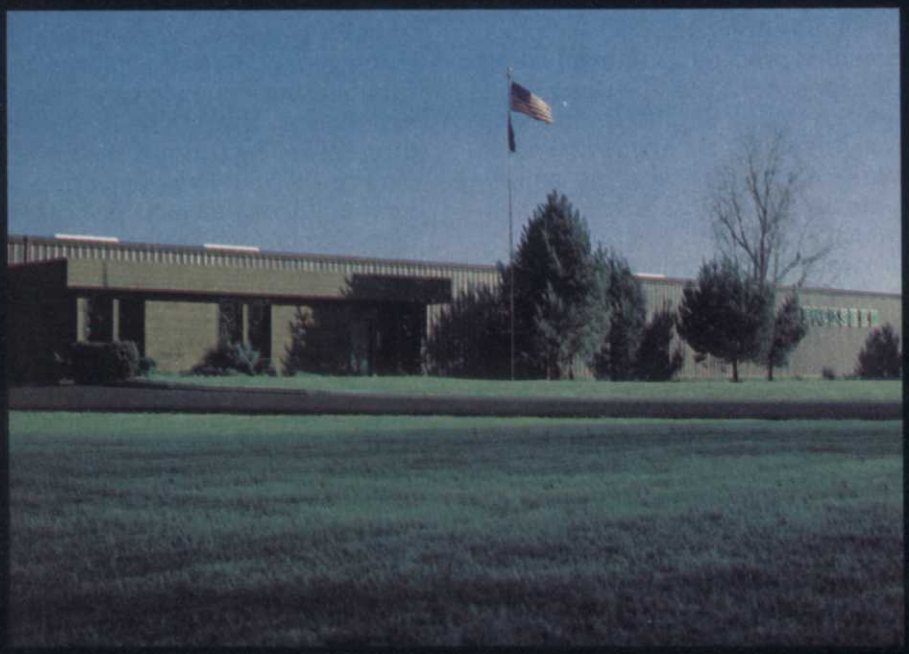

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in a textbook, and say 'Gosh, I wish I knew that last summer.' It sinks in after having had some experience and working."

In addition to training programs, some employers have implemented procedures for evaluating the co-op's experience. At Landscape Design and Construction, Inc., in Dallas, Carl McCord, president of the firm, "highly recommends that each co-op student write a report on what his experience has been. He can write what he has learned about people, about equipment, what he can do, problems with designing, maintenance, whatever he wishes. Based on what he puts into it, the report is graded on a scale of one to ten. We give him a bonus based on the grade. It gives us a gauge in the interest he had in the job, so we can start paying attention to prospects."

McCord suggests that employers recruit co-ops from a number of colleges. "The student returns as a recruiter with lots of praise or condemnation, if you've been hard on him." Greater variety decreases the chances of getting saddled with a bad or an inaccurate reputation.

He also suggests that professors visit the company. "They should have some sense of what's going on. It's not fair to recommend a place without having been there."

McCord doesn't like his co-ops to stay in the same city or the same branch of his company. He has them move around so they can "see different aspects of the industry."

"The co-op student gets an opportunity to see all the different seasons, the cycle," says McCord. "If a student is interning in the summer, that's all he knows. He's not getting experience throughout the year."

● "We're pretty selective in our recruiting process. Unless they're pretty sharp, we won't hire them." . . . Bruce Hunt, vice president and general manager, Theodore Brickman Co.

Another advantage of co-oping McCord sees is that it "breaks the nine-month syndrome. We've been trained after 12 to 16 years of schooling to live like that. It leads to demands after less than a year for promotion."

Landscape Design and Construction has been hiring co-ops since 1974. McCord estimates retention of co-ops at "60-70 percent, even higher. By the hiring time, they've discarded you or you've discarded them. You get the marriage or the divorce before graduation. Because of that, you can turn the co-op loose in the field faster than the young grad with no experience."

Cooperative education, like all programs, is not a panacea. It is not problem free. Wally SaBell, president of SaBell's, Inc. has worked with co-op students for five years. Two years ago SaBell's employed 17 co-ops, and last year they employed 12. SaBell arranged to help students find housing, "to encourage students to get field experience. Especially in landscape architecture, before becoming directors of programs, students need field experience to relate to the problems of the contractors. You can eliminate problems due to prethinking, which comes from experience."

But SaBell was disappointed. "The co-op's staying power was not good after they graduated. Only one out of five remained. They don't know what they want to do in college or once they graduate. Many of them expect to start at the top and work their way down. I don't think they really understand the business.

"Some of the boys couldn't adjust to the real world," SaBell said. "The difference between college and industry output is not always smooth. You went and educated yourself, but there are a lot of humdrum, monotonous little events to deal with. Landscaping requires more common sense than just having a degree in your hand."

Another problem SaBell sees is that "we're trying to produce too many designers. Not all people should be landscape architects and horticulture designers—how many designers do you need? We need more superintendents, product managers, and foremen. We need more two year programs rather than four year programs."

SaBell's solution to the problem of the unrealistic expectations which burden the co-op student and their overtraining is not fewer, but more co-ops. "They've got to get more practical experience. You've got to find out what the world's all about."

SaBell is a "190 percent advocate of co-ops. It's best to get a job or co-op with a larger firm where there's a wider range of activity. We look for individuals seriously interested in the industry. Some co-ops have said to me 'we've learned more with you in three months, than in three years in college.' The industry should encourage co-oping. Students should serve—even if it costs them a fortune."

J. Grady Brown, president of Dallas Nurseries and Garden Centers, agrees. His experience with Mississippi State interns over the past several years has been "fairly satisfactory on the job, but unsatisfactory in getting them back." Too many of the students are "home grown folk" who are unwilling to leave home to "derive a living." Brown applauds the recent increases in out-of-state students attending Mississippi State, and is trying to establish co-op programs closer to Dallas at Texas Tech, Texas A&M, and in Steubenville.

"You have to sell a school on a program," Brown maintains. "You have an uphill battle regardless of the merits of the endeavor. You have to buck the administration, and sell the deans and the business end of the university on the idea. So many programs are good, but the wheel that squeaks the loudest gets greased first."

Some employers don't understand the essence of co-op. Others may feel obligated to keep students who don't succeed. At times organizations are not able, or don't think themselves able, to accommodate the beginning student.

"If you have difficulty managing a business, you'll have difficulty managing a co-op program," says Bruce Braunstein, vice president of Environmental Industries in Calabasas, California. "A certain amount of consistency and credibility building is required. Co-oping is a long term program for the benefit of the student and the employer. The co-op is concerned with doing a good job. It's not just a one time experience. The successful co-op will often come work for the company."

• "I'm a 190 percent advocate of co-ops. You can eliminate problems due to prethinking, which can come from experience. But, the staying power of co-ops was not good after they graduated." . . . Wally SaBell, president, SaBell's, Inc.

Co-oping is essential because it allows a student to find out "early in the game" whether he likes landscaping or not, says Len Spencer. One graduate came to the Spencer Co., with a specialty in turf management. "During the summers he had worked in a factory because there was more money involved. He had a fine horticultural education, and asked for a complex job. He started as a probationary Crew supervisor. He decided after two weeks 'this is not for me, it's below my level.' He got a job as a dispatcher for Sears, after four years and $40-50,000."

Co-oping is the "nearest thing we have to old world apprenticeships," says Spencer. Students who are willing to spend an additional year in school and face the hassles of relocation and discontinuity in their education reap the rewards of experience, maturity, and greater marketability when they graduate. Schools that run the programs help bridge the undesirable gap between the ivory towers of the university and the soiled hands of the real world. As the Mississippi State prospectus explains: a regular graduate is a purchase—a co-op student, an investment. **WTT**

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CULTURAL PRACTICES TO DISCOURAGE POA IN KENTUCKY BLUEGRASS

By A. Douglas Brede, graduate research assistant, The Pennsylvania State University, University Park, PA.

A. D. "Doug" Brede is a graduate research assistant at Penn State, where he is currently finishing a Ph.D. degree in Turfgrass Agronomy. His doctoral research deals with the interaction of perennial ryegrass, Kentucky bluegrass, and *Poa annua*. He is a native of Pennsylvania and is a former golf course assistant superintendent.

How can two neighboring turfs, both of Kentucky bluegrass, contain such different amounts of *Poa*? You've probably read a list of the sins that result in *Poa*: overwatering, compaction, traffic wear, divots, etc., etc. It's common knowledge that these evils will open established turfs to *Poa*.

But have you ever noticed that some stands seem to contain *Poa* right from the start? It's as if the *Poa* came up at planting time. Although a great deal is known about *Poa* invasion of established turf, the problems of *Poa* in the seedbed are unsolved.

Recent studies at Penn State have confronted this dilemma. We've discovered several ways to limit the amount of *Poa* that comes up with a stand. I'm not talking about herbicides or seedbed treatments, but cultural methods that you can use to cut down on *Poa* when you plant.

Cultural methods

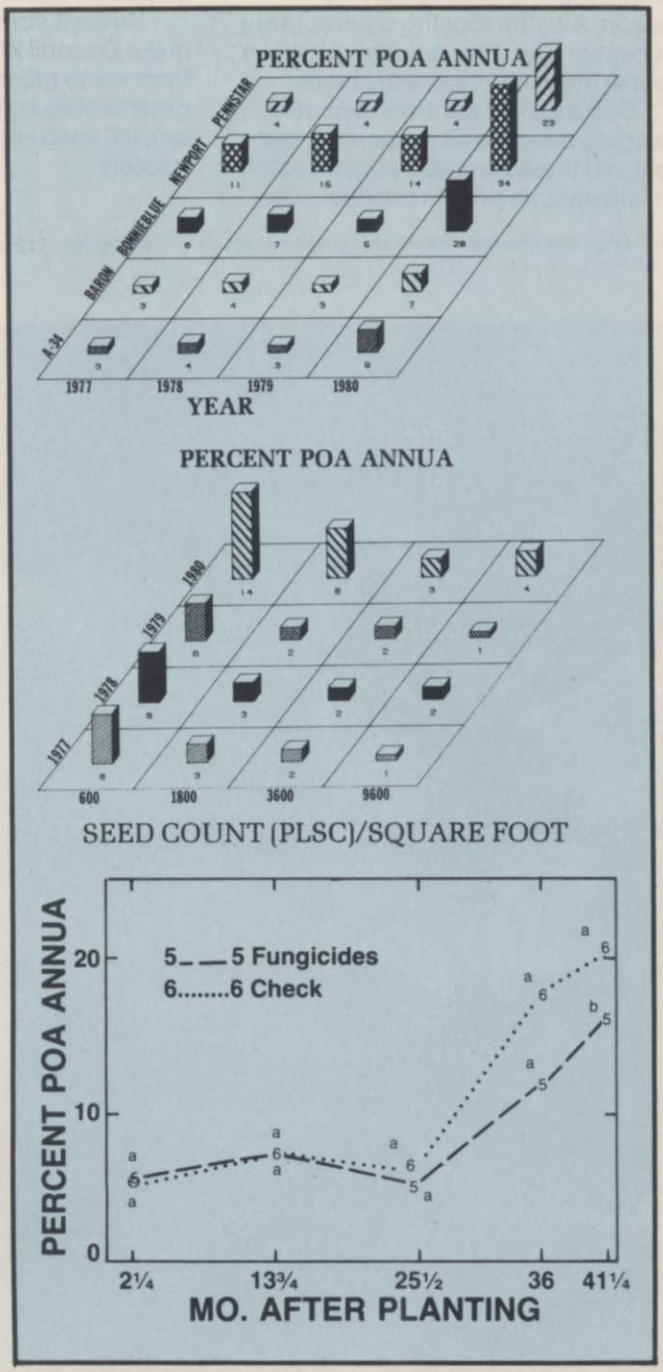
You've probably heard turf managers say, "Raise your cutting height; that'll cut down on your *Poa*." It's been known for years that Kentucky bluegrass fights *Poa* best at higher cutting heights.

We found twice as much *Poa* at ½" than at a 1" height. But the remarkable thing was that only a few weeks of close mowing were needed to let in the *Poa*. A two-month-old Newport stand, with only a month of mowing under its belt, had 88% more *Poa* at ½" than at 1".

Let's say you're planting a Kentucky bluegrass lawn in an area where *Poa* is a problem. And let's say that you want to mow it at 1". How can you best manage the mowing to limit *Poa*?

First, begin mowing as soon as the grass reaches 1½"; use a 1½" setting on the mower. Then, keep it at that height for about a month. Take an additional month to lower the height, a little bit each time you mow. This will give the desired grass a chance to establish itself. Remember, if you mow Kentucky bluegrass lower than an inch, you're asking for *Poa*.

One of the most important decisions you'll make in planning your new turf area is the cultivar (variety). In our study we tested five popular cultivars to see which ones limited *Poa* invasion. Newport, a less vigorous bluegrass, allowed a large invasion of *Poa* during the first few months after planting. It also kept that



portion of *Poa* for more than three years. A-34 (BenSun) and Baron, on the other hand, prevented *Poa* in the first few months and never did let much in. A vigorous cultivar will not only look good, but it will also work to keep *Poa* out.

So, you've decided on your cutting height and cultivar. The next question is: How much seed to use? Textbooks tell you to seed bluegrass at

Continues on page 36

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1-2 lbs. per 1000 square feet. But is this the right rate for keeping *Poa* out?

To answer this question, we established several plots with seeding rates of 600, 1800, 3600, and 9600 pure-live-seed count (PLSC) per square foot. With the PLSC method, we knew how many viable seeds we were planting per square foot of soil. These rates spanned a range from roughly ½ to 10 lbs. of seed per 1000 ft².

The results were surprising. Seeding rate affected the amount of *Poa* for more than three years after planting. Low seeding rates (1 lb. and less) let *Poa* invade during the early months of growth, before Kentucky bluegrass could take hold. After the damage was done, the *Poa* spread. *Poa* seldom relinquishes what it gains.

Vigorous cultivars seem more immune to *Poa* invasion than their weaker cousins, especially at low seeding rates. If they can put up a good struggle against *Poa* in the first few months, they've got it made. Weak cultivars tend to lose the benefit of higher seeding rates as time goes by.

Very high seeding rates (above 4 lbs.) can predispose turf to seedling damping-off diseases. Heavy rates only feed the fungi. Once damping-off hits, you're back to the same problem: A stand full of holes where *Poa* can invade.

We were lucky; damping-off wasn't a problem in our test. You might not be so lucky.

What's a good Kentucky bluegrass seeding rate? 2-4000 PLSC/ft² (see accompanying explanation of the PLSC method).

How do fungicides affect *Poa* invasion?

At the beginning of our experiment, we had equal *Poa* in each of two plot areas. We sprayed one area with fungicides, leaving the other area untreated. We made 5 to 9 applications per year of common turf fungicides in a disease-prevention effort.

Fungicides had a cumulative effect, holding back the amount of *Poa* that invaded the treated area. Maybe the fungicides had some beneficial effect on the Kentucky bluegrass or perhaps a detrimental effect on the *Poa*. In any event, 3½ years later, there was less *Poa* where fungicides were used.

Of course, fungicides shouldn't be used as a *Poa* control. It would cost you thousands of dollars for only 5% less *Poa*. But if you are using fungicides for disease control, less *Poa* is a side benefit.

Why Poa wins

Poa is botanically a sister of Kentucky bluegrass. The plants look similar. The seeds are about the same size. But if a few *Poa* plants get into bluegrass turf, they take over. This is especially true when the stand is young.

We tried to find some answers by seeding *Poa* and Kentucky bluegrass side-by-side and watching their progress. *Poa* seedlings broke ground two full days before Kentucky bluegrass. Ultimately, 90% of the *Poa* seeds produced seedlings, compared to only 45% of the Kentucky bluegrass, even though lab germination of the two was nearly the same.

In another experiment, we seeded a mixture of *Poa* and Kentucky bluegrass. Neither grass bothered the other during germination. The takeover by *Poa* came during the month after germination. *Poa* produced twice as many tillers as Kentucky bluegrass and four times as much leaf dry-weight from an equal number of seedlings.

Summary

Poa is a grass that never passes up the opportunity to get involved. In established turf, mistakes in management and wear and tear give *Poa* the chance it needs to get a foothold.

Poa can also be a problem in seedling stands, germinating with the desired grass and later taking it over. Cultural methods can be helpful in limiting *Poa* in a young stand.

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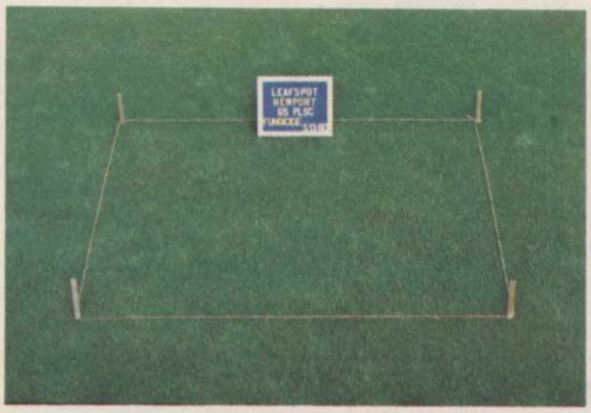

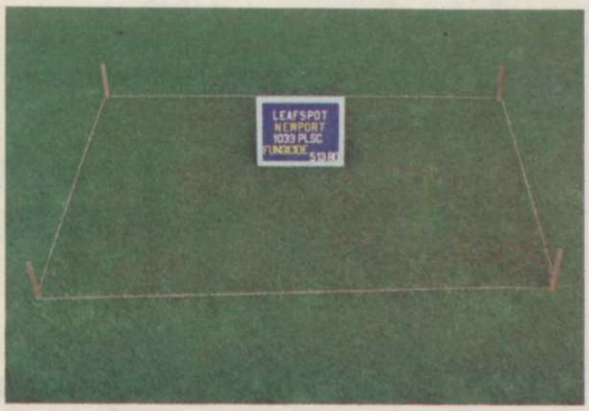

Newport Kentucky bluegrass shows the effect of seeding rate on Poa annua after three years. Photo on left shows seeding rate of 600 pure-live-seed-count per square foot. Photo on right shows rate of 9600 PLSC/sq. ft.

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Poa vs Kentucky *from page 34*

PURE-LIVE-SEED-COUNT

Seed quality is important, no matter what size area you're planting. If you're undertaking several acres, minor differences in seed quality can add up to major savings.

Many things go into good seed quality: purity, freedom from weed seed, germination percentage, and the number of seeds per lb. You can find that information on your seed label or tab, with the exception of the number of seeds per lb.

Modern bluegrasses vary considerably from the 2.25-million seeds per lb. figure often quoted for Merion. In fact, depending on the cultivar, they can range from 850,000 to 2,000,000 seeds per lb. — a 2X difference! That translates to a possible 2X savings on the cost of seed.

In the PLSC method, first enter the desired PLSC/ft² rate; a value of 2-4000 PLSC/ft² will work nicely. Next, multiply by the number of square feet to be seeded. Divide by the number of seeds per lb. (see list below). Divide by the purity listed on the tag (if the purity is 95%, enter 0.95). Divide by the germination listed on the tag (as a decimal again). Hit the = and you get the lbs. of seed needed to plant your area.

Here's an example. Say you want to plant a 10,000 ft² lawn to a 50-50 blend of Merion and Birka. And you want to seed at 4000 PLSC/ft². That means you'll need 2000 PLSC/ft² of each cultivar.

The seed tag on your Merion lists 99% purity and 92% germination. Your Birka has 95% purity and 80% germination. Thus, because of different seed qualities, you'll need quite different amounts of seed for a 50-50 blend: Merion 11 lbs., and Birka 31 lbs.

The following are seed numbers of several popular bluegrasses, from studies at Ohio State and Penn State:

Cultivar	Seeds per lb.
A-34 (BenSun)	1,500,000
Adelphi	1,300,000
Baron	1,100,000
Birka	850,000
Bonnieblue	1,100,000
Brunswick	1,600,000
Cheri	1,100,000
Delta	1,400,000
Fylking	950,000
Galaxy	1,100,000
Glade	1,200,000
Majestic	1,200,000
Merion	2,000,000
Newport	1,200,000
Nugget	950,000
Parade	1,200,000
Park	1,200,000
Pennstar	930,000
Touchdown	1,300,000
Vantage	1,500,000
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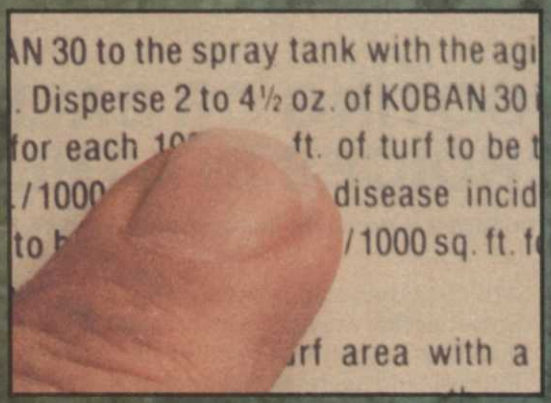

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FOOTING OR BALL RESPONSE: CHOICES IN ATHLETIC FIELD CARE

By Dr. William H. Daniel and Dr. Raymond P. Freeborg, Purdue University, West Lafayette, IN.

Athletics is an important segment of our culture. Societies that are not actively at war need athletic activities to channel the enthusiasm, competitive interest, and aggressive tendencies of its citizens. People of many cultures are motivated by a "cause." The challenge of a contest plus the desire to be for something or to take sides is inherent in human beings. Therefore, the therapeutic value of sports within a society has deep roots in the nature of man. As a result, many games have evolved to challenge and test a player's skill, conditioning, and training.

Sports that demand physical contact have attracted society's plaudits for centuries. The voluminous sports coverage in newspapers, the variety of sports magazines, and the TV time dedicated to reporting sports is indicative of the extensive interest in athletics.

The turfgrass surface of athletic fields is designed primarily for the "footing" of the players with less emphasis on ball response. Football, rugby, soccer, field hockey and lacrosse involve running, falling and body contact, as well as some ball response. The games of baseball, softball, and cricket involve less player contact but increased emphasis on ball response and player footing. Areas for volleyball, deck tennis, badminton and playgrounds receive intensive wear, but the response of the ball is of less concern. The maintenance of polo grounds provide an additional challenge due to the stress on the turf area caused by horses' hooves. However, each of these intended uses creates similar problems of turf growing and management, due to the compaction of soil and intense wear.

The maintenance of athletic facilities presents the turf manager with three major areas of concern: Conditions or health of the **turfgrass,** the firmness and uniformity of footing for the **player,** and the color and grooming of the turf surface for esthetic value to the **spectator.**

Accumulated surface water weakens turf and causes unstable soil. Soil surfaces, even when the turfgrass cover is worn, need to remain smooth and stable (as in basepaths, infields, or the center of football fields). Wear-tolerant turf is necessary for safety and appearance and should be achieved in spite of intense use that reduces quality and quantity of existing turfgrass as the season progresses.

The turf surface is important to the player as he runs, stops, turns, twists, jumps, falls and gets up. The player seldom has a controlled fall, but more likely is tackled, blocked, pushed, piled onto, rolled or stepped on. He may slip, slide or twist. Many athletic injuries are due to body contact between players. As a ball carrier is tackled, there is often extreme pressure on his feet and legs as he tries to advance. The opposing forces create upper body twisting and cause extra stress on the knees. The inherent "give" of natural turf reduces some of this stress.

Derived from Turf Manager's Handbook, published by Harcourt Brace Jovanovich Publications, 1 East First Street, Duluth, MN 65802. See book ad in magazine.

Maintenance of Athletic Grounds

A dense, wear-resistant turfgrass cover on athletic fields reduces the number and severity of player injuries, provides good footing for better game performance, and presents a pleasing appearance. The use of agronomic principles and good judgement can contribute to a successful maintenance program.

Correct timing of all maintenance operations is of prime importance; each practice needs to be related to the state of turfgrass growth, to varying ground and weather conditions, and to the projected use of the area.

The following concepts of grounds management relate to areas used for football, as well as parks, baseball fields, playgrounds and multiuse areas which have similar demands and requirements. The football player spends many more hours working or playing on practice fields than in the stadium. Therefore, there is a need for the best turf possible on the practice fields.

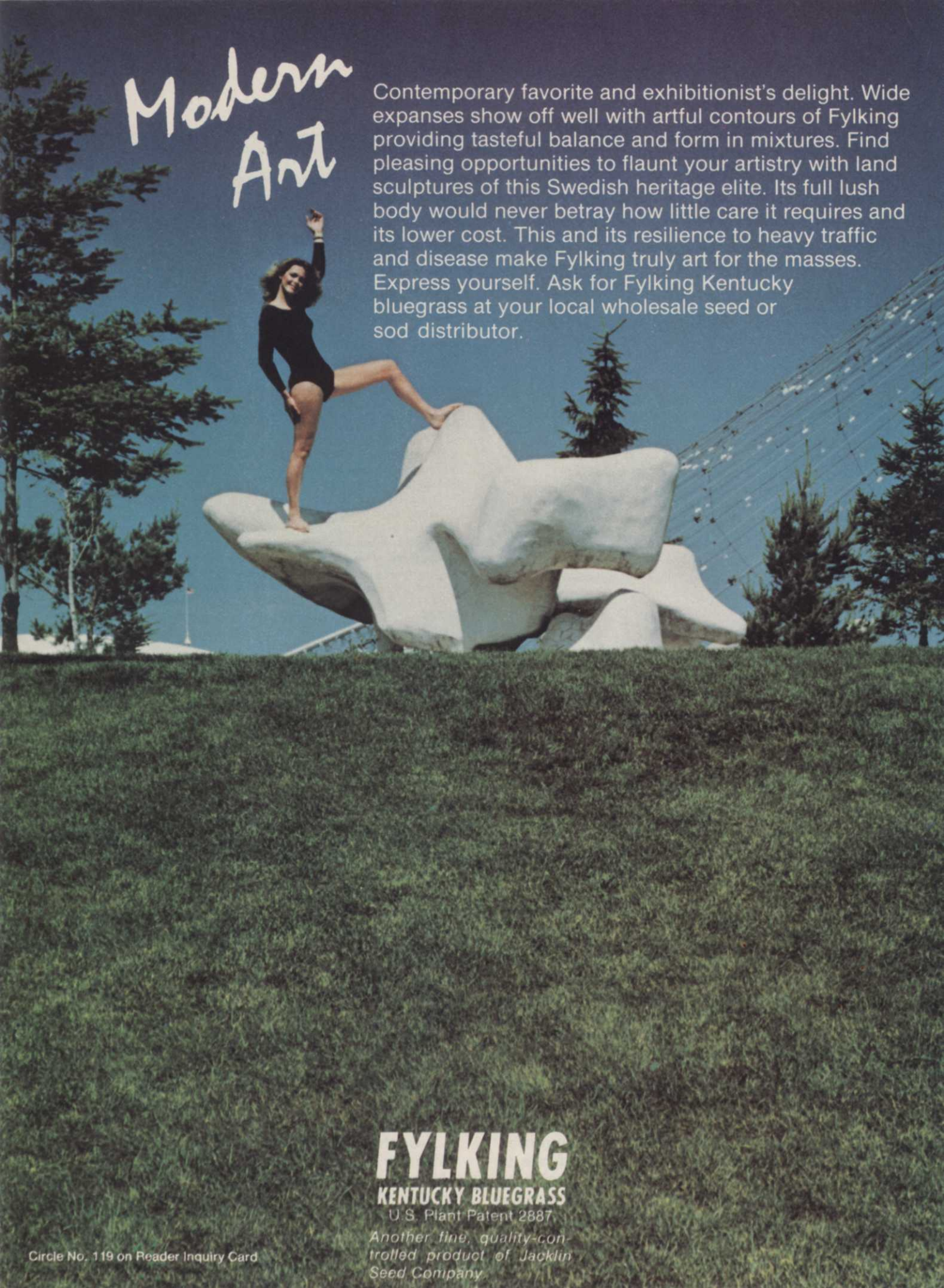
There are three general levels of athletic field maintenance determined by budget, available equipment and technology. Timing is vitally important; nature's growth processes require time. In general it is better to be early rather than late with management procedures.

Wear Tolerance of Grasses

Currently the improved grass varieties provide increased resistance to wear. Both ryegrass and tall fescue have a high fiber content, which provides increased wearability. Because of seedling vigor, the overseeding of ryegrass can provide a continuous new growth during the playing season. In California pre-germinated seed has been spread on the athletic field prior to a scheduled game. Following the game the field is covered with clear plastic sheeting for 6-12 days, depending on the weather. The young grass is green by the following game time.

Vertical cutting of turf of bermudagrass cultivars, such as Santa Anna, should be done when the conditions are conducive to rapid re-

Continues on page 42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Economy Athletic Field Care

a. **Fertilize** in early fall (August 10 in Indianapolis). Use 60 pounds of nitrogen on a field or 100 pounds inside the oval track. Examples: 45-0-0 at 120-200 pounds or 16-4-8 at 300-500 pounds.
b. **Water** as needed. Consider the use of traveling type irrigation equipment with automatic cutoff. These are available in the larger turf-types with 400 feet of cord and 1-inch plastic hose or the smaller lawn types with 100 feet of tape and ¾ inch hose.
c. **Mow** often at a two-inch height (as high as practical rather than as low as possible). Maintain adequate leaf surface that will tolerate increased wear and produce energy within plants. Bermudas should be cut closer.
d. **Overseed** lightly before each home game. Spread 5 pounds of seed with broadcast seeder over the worn areas. Let the cleats push the seed into the soil.
e. **Mulch** thin areas immediately following the last game of the season with crushed corncobs or other organic material which favors soil aggregation as it decomposes.
f. **Fertilize** in late winter or early spring (April 1 in Indianapolis) to promote early grass growth.
g. **Kill broadleaf weeds** and knotweed before they compete with turfgrass (before June 15). Use 2,-4-D and dicamba combined. Follow label instructions.
h. **Prevent crabgrass,** etc. by the use of preemergent herbicides which can be applied (April) with fertilizer. Apply following the first mowing in the spring.
i. **Mow often** but with a high cut during the summer. This favors the production of deeper roots and builds reserves of energy in the rhizome.
j. **Spread wear** as much as possible to protect the center of field. Mark an extended 5-yard line where possible for optional practice (band and team).

Improved Care For Athletic Fields

a. Use turfgrass fertilizer high in N, low in P, medium in K. (16-4-8, 18-5-9, 24-4-12). When using slow release nitrogen apply two to three pounds N for each 1000 sq. ft. in mid-August.
b. Prior to August 15 irrigate (heavily) only when wilt starts to show. If in doubt, don't apply more water. After August 15, water lightly and frequently as needed to maintain optimum playing conditions.
c. Mow at a two-inch height during summer, then one and one-half inches after the first fall home game for bluegrass and ryegrass.
d. Overseed before each home game. Use newer, more disease resistant varieties of grasses.
e. Fertilize mid-fall to encourage new plant growth.
f. Mulch thin areas (immediately following the last home game) with one ton crushed corncobs or other organic material which, as it decomposes, favors soil aggregation and separation. However, additional fertilizer will be required the following year to offset the nutrients tied up in decomposition.
g. Fertilize lightly with a soluble nitrogen source to force growth in the early spring.
h. Kill broadleaf weeds and knotweed as needed.
i. Prevent crabgrass. See economy field care procedure.
j. Mow frequently and high.
k. Cultivate intensely once in mid-summer to loosen the soil, reduce compaction, bury crowns of the plants and aid in surface leveling (rental machines are available). Repeat treatments in one day; greensaire twice, aerify three to six times. Spread fine sand, shread the soil cores, drag, smooth and water as needed.
l. Extend yard lines to fence for maximum practice area. Use center for pass patterns only. Minimize practice on the field. Mark off 5-yard lines in other turf areas for band practice and wet weather use.

Best Care Program for Athletic Fields

In addition to the "economy" and "improved" care programs there are other maintenance procedures that aid in producing the best turfgrass possible.

a. Build up levels of N,P and K by the use of slow release fertilizers. Test composite 2-inch soil samples to determine needs. Use lime and gypsum only if needed.
b. Install an automatic pop-up, padded head irrigation system (consult reliable irrigation suppliers). Consider the use of three rows of full circle, or four rows, including two part circles, for the edges of the field. Use only as needed.
c. Mow frequently. Vertical cut and selectively thin, particularly at the edges of the field where thatch accumulates.
d. Repair divots following each game. Overseed before each game with ten pounds of seed. Consider resodding the field to newer disease resistant grasses.
e. Maintain a high nutrient reserve in the soil.
f. Use clear, perforated plastic sheeting over the turfgrass area to conserve heat, hold moisture, and reduce freezing.
g. Fertilize lightly with a soluble nitrogen source to promote early spring growth.
h. Prevent crabgrass, etc. See economy procedure.
i. Kill broadleaf weeds and knotweed as needed. Spray for leafspot control (four times a year) or as wet, humid weather dictates.
j. Mow in alternate direction (football fields) every five yards to produce a contrasting pattern.
k. Annually power slice as deep as possible; work from sideline to sideline; go up and down the slopes. Apply premixed top-dressing material or washed fine sand following the last game, then aerify and loosen the soil.
l. To improve appearances the damaged areas of the field may be sprayed with colorants.

Note: It is reported that shorter shoe cleats, soccer types, less than one-half inch, are safer for players and do less damage to turfgrass.

covery (early summer). Cool season grasses may be vertically cut any time during the season in the outer areas of the athletic fields that receive less wear, provided there is time and conditions are favorable for recovery before heavy use or natural dormancy.

The wear tolerance of the turfgrass increases as the green vegetation increases per unit area. Moderate amounts of thatch provide protection to the turf by the cushion effect, which improves wear tolerance. Wear tolerance of turfgrass is favored by application of a moderate quantity of fertilizer rather than an excess, slow release nitrogen rather than soluble, medium moisture level rather than an excess wetness, adequate potassium supply rather than low, open sunny area rather than shaded, and a balanced nutrient level.

Most turfgrass species have an optimum height at which they should be maintained for maximum quality turf. A turfgrass mowed at one inch (normal for species and conditions) may have several times the wear tolerance of the same grass mowed at one-half inch (stress).

Research by Beard, Anda, and others of Michigan State University, using a wear machine, has contributed information concerning species relationships.

In a specific wear tolerance test of 18 blue-

Continues on page 44

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Relative Wear Tolerance of Turfgrasses When Grown in Their Respective Regions of Adaptations:

	Turfgrass Species	
Relative Ranking	*Warm Season*	*Cool Season*
Excellent	zoysia	—
	bermuda	—
	bahia	—
Good	—	perennial ryegrass
	—	tall fescue
	—	Kentucky bluegrass
		red fescue
Medium	St. Augustine	
Poor	carpetgrass	creeping bentgrass
	centipede	colonial bentgrass
		Poa annua
		Poa Trivildes

grasses (five year old sod), the remaining verdue (green wet weight) ranged from 7.9 to 1.6 grams and the reduction in verdue varied from 18 to 66 per cent.

In areas where compaction is a problem, such as golf tees, centers of football fields, volleyball courts, etc., it is desirable to maintain sufficient crowns and stolons so that regrowth provides continuous and uniform turfgrass cover.

In heavily trafficked areas where the turfgrass is worn enough to destroy crowns of grass, resodding is generally the wise solution. Seedlings seldom survive in areas that are receiving heavy wear.

Topdressing

Many turfgrass areas for athletics are initially constructed with limited resources. As the area is used, demands or requirements for the area increase. Topdressing can be used to improve the surface. Organic materials (peat, manure, crushed cobs, fine barks, hulls or composts) can dilute tight soils and, as they decay, aid in granulation and structural improvement of the soil (when a hard surface is not required).

Apply topdressing materials to

1. protect the crowns of growing grass,
2. level the surface,
3. increase resiliency of the playing surface,
4. improve soil structure,
5. increase water holding capacity of the soil,
6. increase water infiltration and percolation rates,
7. improve the nutrient level of the soil,
8. increase cation exchange capacity of the soil.

Topdressing materials should be spread evenly over the field or the portion of the field as needed. After the topdressing is spread, the field should be intensely cored. Depending on design, coring machines can be used over an area 2-6 times in one day. The cores should be shredded and distributed by dragging, to aid in smoothing and leveling the surface.

Extra nitrogen fertilizer may be required as the organic matter decomposes, but nitrogen will later be released as the organisms causing decay die.

Soil Warming

Heating the turfgrass from below the soil surface will extend the length of the turfgrass growing season and allow increased use of an area. The benefits include (a) enhancement of root and shoot growth, (b) reduction in frozen soil (c) protection from light frost, (d) aid in snow removal, and (e) improved winter grass color.

Soil warming research began in England and Sweden about 1960, and at Purdue University (Indiana) in 1963. Hot liquids, hot air and electric resistance cable have been used. The resistance cable is preferred since it offers greater convenience in installation and maintenance.

Heating cable providing resistance of 5 watts per foot or 16 watts per meter has been adequate when placed 6 inches (15 cm) deep and one foot (3 cm) apart in the center of an athletic field. Spacings of 18-24 inches are used in the outer portions of the field where the turf wear is less, and a normal turfgrass cover is easier to maintain.

The fields at the Air Force Academy, Colorado, and Lambeau Field at Green Bay, Wisconsin, are two of the earlier installations of soil heating in the United States. More recently heating systems have been installed at Foreman Field, Goshen Indiana; Ross Ade Stadium, Purdue University; Mile High Stadium, Denver, Colorado; Kennedy Stadium, Washington, D.C.; and University of Wisconsin at Milwaukee, Wisconsin. Three Michigan fields also have installed soil heating equipment.

Since some athletic events are scheduled in spite of weather conditions, anything that helps counteract the weather extremes and provides improved playing conditions is beneficial.

In fields that have soil warming equipment, frost action is minimized, playing surfaces remain firmer, snow melts from below and creates less wetness. Roots and crowns of cool season grasses grow when temperatures are above 40°F (50°C), so replacement or growth of plant parts is favored. Seed germination and new sod rooting is also favored.

The increased demand for sports facilities will create a greater need for soil warming. The increasing costs of energy could restrict this.

Continues on page 76

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AWARD WINNING PARK SYSTEM DEPENDS ON EFFICIENCY FOR GROWTH

The Sunshine State may be a haven for outdoor enthusiasts, but the leisure needs of Palm Beach County's 620,090 residents and 1.6 million annual visitors are met by more than Florida's tropical weather.

Over the last ten years, George Irvin Jr., horticulturist for Palm Beach County Parks and Recreation Department, has helped institute a whole host of programs designed to appeal to the area's diverse, recreation-oriented population. Along with these new programs has come a parallel concern for upgrading and improving the park areas themselves.

"Because we are one of the fastest growing counties in the United States, we have had to do a lot of planning and experimenting, both facility- and maintenance-wise," the native Floridian explains, noting that acquisition and development of publicly-owned land and facilities for recreational use have almost doubled since 1973. "Year-round usage also necessitates a strong maintenance program that keeps the parks lush, beautiful and available to the public.

"The Parks Department is so large and diverse that my responsibilities range from landscaping and resodding, to tree and hedge trimming, running the spray department and nursery management," says the Florida State University graduate. Maintenance of baseball fields, tennis courts, buildings, signs, plumbing and the like is handled by other divisions within the department, he adds.

The 48 parks and recreation areas in The Palm Beach County Park System cover more than 4,000 acres of inland and beach front property. The average park covers about 50 to 75 acres, and is designed to fit the specific needs of the local community. "Many of our parks are geared toward neighborhood activities and are comprised of ball fields, play equipment and sitting areas," observes Irvin. "Others, like 1,053-acre John Prince Park in Lake Worth, have full-scale recreational facilities that include boating, tennis, picnic areas, and jogging and bike trails."

Neatly groomed area in Japanese garden is maintained year-round by use of chemicals.

Ten New Parks

Maintaining parks for the largest county east of the Mississippi River is a challenge George Irvin has enjoyed for more than a decade. And, it's destined to become even more of a challenge with ten new parks slated for completion within the next five years. This expansion, together with little or no increases expected in his one-million dollar maintenance budget, has made cost efficiency one of George's overriding management considerations.

With an extensive background in professional landscaping that dates back to his ownership of a landscape business, Irvin is well-aware of the importance of an effective program to control undesirable vegetation. "Most of our parks were constructed with unsterilized soil, and I'd estimate every square foot of soil contains close to 10,000 weed seeds," says Irvin.

Over the years, Irvin and his crew have tried more would-be weed remedies than they care to remember. "Hand weeding proved totally ineffective," recalls Irvin, who cites torpedograss as his main weed menace. "We'd have a man out weeding all day, and 24 hours later two weeds had taken the place of the one he removed. We needed a better solution, so we turned to chemicals."

Seeking a different approach to weed control, the County Parks and Recreation Department started experimenting with Roundup herbicide in 1976. The product was applied at the rate of four quarts/acre on several 10 x 10 foot plots in sectors of John Prince Park that were off limits to the public. "We concentrate our maintenance efforts in areas of public use, so you can imagine the kind of jungle we had growing in these restricted areas," Irvin observes.

Using two men and one spray unit with a 300-gallon fiberglass spray tank, he experimented with both spot and broadcast applications, around signs, plant beds, tennis courts, baseball fields, and just about everywhere else in the parks.

Having eliminated much of the expense of hand labor, George Irvin proudly notes that he has cut his department's labor and herbicide costs in half.

Continues on page 50

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Park *from page 48*

$500,000 Nursery

As if the parks weren't enough for Irvin and his staff of 25 full-time employees to handle, his division is also responsible for Palm Beach County's 5-acre nursery. The $500,000 nursery, one of the largest in southern Florida, is the starting point for such semi-tropical trees as Live Oaks, Black Olives, Pines and various Palms. Also growing in the nursery are such exotic trees as Orchids, Golden Rain, Royal Poincianas, Seaside Mahoes and Roseapples.

Surrounded by natural vegetation, the nursery has long been a catalyst for the proliferation of Irvin's worst weed nemesis, torpedograss. "Every weed that goes to seed is blown into the nursery by the wind. So our weed control program is predicated on eliminating weeds growing alongside the nursery and in the roadways," he states.

This overall maintenance and weed control program has proved successful not only from a cost standpoint, but from a beautification standpoint, as well. The department was a finalist in 1978 and again in 1979 for the National Gold Medal Award, an annual honor bestowed on parks and recreation departments who have established themselves within the community and captured the imagination of local residents with unique, well-maintained facilities.

New Park

Obviously, the beauty of the County's parks is not simply in the eye of the beholder. And recent construction of Morikami Museum west of Delray Beach further confirms that observation. The 140-acre spread, donated to the County in 1975 by George Morikami, a Japanese immigrant, is a magical wonderland of Japanese culture. But, as George Irvin points out, it hasn't always been this way.

When construction began in 1975, the first step was to eliminate all the weeds that had overrun the park site. "Torpedograss has been growing for so many years the roots were 5-10 feet long. We controlled the weeds by broadcast applying four qts. of Roundup mixed in 20 gallons of water per acre, and set to work building."

Palm Beach County Parks draws from efficiency to meet growing demand for recreational facilities by visitors and residents.

Today, the one-time swamp is a tribute to Mr. Morikami's heritage, complete with a cultural museum and tranquil Bonsai gardens. Constructed of materials resembling the rice paper walls and tatami mats traditional to Japanese architecture, the museum gives visitors a sense of having just arrived in the Orient. The newly constructed picnic area—with shelters resembling Japanese tea houses and accompanied by such exotic plant materials as Water Lillies and Cat Tails and such trees as Bamboo, Holly, Silk Oak, Spanish Cherry, Jasmine and Japanese Black Pines—contributes to the theme, as well.

Proud of the beauty of Morikami, George allows himself the pleasure of maintaining the gardens with his crew. Somehow, he manages to find time to constantly prune the trees in strict Bonsai tradition.

"Our growth is based on an ongoing evaluation of the community's interests and needs," he states, adding that five years ago recreational and athletic programming was non-existent. "Morikami is one example of this attitude; another is the recently-constructed Heart Trail in John Prince Park." The trail is one mile long, and features 20 stations that prescribe exercises to benefit the entire body.

With the implementation of $56 million in bond issue funding, and more than $20 million in state and federal grants, Palm Beach County parks are rapidly becoming the most utilized and admired in the southeast. **WTT**

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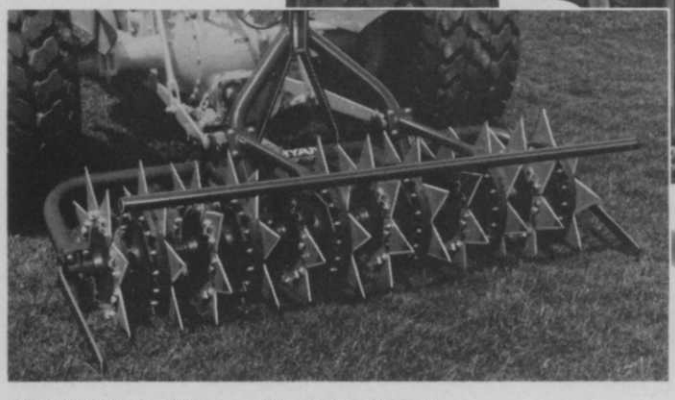
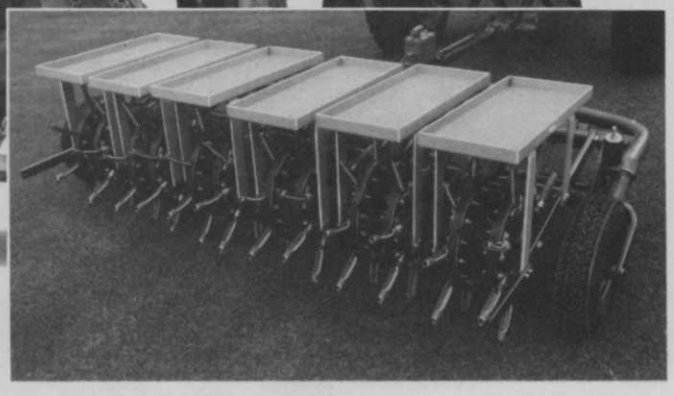


TRACAIRE® (Shown with slicing tines)



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Gordon Baker has been involved with industrial vegetation management for over ten years: "Our project is second only to TVA in size. We have between 1400 and 1500 miles of interconnecting canals to cover. Over the last six years, we've used Banvel 720 for ditchbank brush control because of its economy. And, because it's right up there at the top for effectiveness."

Ed Ingle, landscaping engineer, North Carolina Department of Transportation, Division of Highways.
Ed Ingle recommends vegetation control herbicides for construction projects and highway maintenance in a seventeen county area: "We have used Banvel for three years and found it was an economical and safe chemical. We've had good results with it where we have a lot of kudzu and multiflora rose. There's really no comparison with 2,4-D alone."

Darryl Fendley, founder/owner, Certified Services, Cleveland, Tennessee.
Darryl Fendley has provided industrial vegetation control work for utilities and industrial facilities for over three years: "We use Banvel 720 for vines and brush control. It does a pretty good job, particularly around sensitive areas, because it doesn't have the soil persistency of some other materials. And, when you compare price, you can use a bit more Banvel than you can with some other products. So my preference is Banvel 720.

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MAINTENANCE, ENERGY CONCERNS INCREASE APPLIED TREE RESEARCH

By Douglas J. Chapman, Horticulturist, Dow Gardens, Midland, MI

Applied tree research is a particularly fertile area today. There exists a need for greater plant diversity (tree and shrub) in the landscape.

This could be accomplished by introducing new trees and shrubs, be they native or imported from such areas as the People's Republic of China and the development and introduction of superior cultivars. Regional cultivar introductions propagated by asexual methods, cuttage and/or tissue culture, grown under accelerated growth, should lead to more efficient production. A high degree of emphasis must be placed on stimulating local nurseries to introduce and propagate their own adapted cultivars of trees and shrubs. Traditional forestry has a similar need, yet diversity means developing a practical production technique for seedlings—determining what plants are photoperiodic responsive and breeding programs which will result in plants developed specifically for biomass, disease tolerance, and lastly, clones or cultivars for specific uses or grown under unique conditions, e.g. Sugar Maple and hickory for wet sites.

When considering landscape trees, the selection, production, and introduction of regional clones or cultivars is paramount to the development of the nursery industry. One in Europe would not expect trees to grow everywhere in the European landscape. We in this country should not expect plants developed and introduced in the Great Lakes to thrive throughout the United States. For example, the native range of *Acer rubrum* is from Michigan's Upper Pennisula to Florida. Yet Florida's *Acer rubrum* would not be hardy in the Great Lakes region and a Northern Michigan Red Maple would collapse in Florida. With continued efforts towards asexual production by cuttage or tissue culture or combinations of the two, the industry can expand the introduction of regional cultivars. High on the list of plants to propagate should be selected cultivars chosen for their environmental adaption, e.g. drought tolerance, disease resistance, and desirable aesthetic qualities (outstanding fall color, flower color, or habit of growth). In the development of new selections, one may want an *Acer rubrum* with scarlet or yellow fall color, light or dark bark, and eco-types for droughty as well as poorly drained soils. These selections will be developed and grown in areas where they are native, e.g. the Great Lakes States, the Northeast, or the Southeast.

Propagating these clones by cuttage or tissue culture will mean that the resulting tree will continue to express phenotypically all of the desirable characteristics for which it was originally chosen with no problem of graft incompatibility or incongeniality. Further, since trees native to northern latitudes are more photoperiodic responsive, we can further reduce the time needed for production by growing them under continuous light, thus the tree remains vegetative and growth continues, accelerating the production schedule of *Acer rubrum* liners from three years to one full growing season.

Another method of propagation which could play a major role in the development of regional cultivars is tissue culture. Where applicable, it can result in the propagation of a large number of individuals in a short period of time. Thus, providing the nursery industry with stock plants for additional propagation. Sink at Michigan State University has been a leader with the development of tissue culture for shade trees, specifically *Acer rubrum* cultivars. His techniques, combined with propagation by cuttage, could speed up the production cycle, making regional cultivars a reality within five to six years. Meyer at the University of Illinois, working with tissue culture, has been successful in the propagation of iris *Hosta Lily*, and rhododendron (Rhododendron c. '*Nova Zembla*').

Why consider asexual propagation of trees and the development of regional cultivars? During the past eight to ten years, a disturbing phenomena has been observed. With increasing frequency, grafts of Red Maple (*Acer rubrum* cultivars 'October Glory,' 'Red Sunset,' and 'Schlesinger'); White Ash (*Fraxinus americana* 'Autumn Purple' and 'Rosehill'); European Ash (*Fraxinus excelsior* 'Hessei'); Pin Oak (*Quercus palustris* 'Soveriegn'); and London Planetree (*X Platanus acerifolia* 'Bloodgood') are showing graft incompatibility or incongeniality. Researchers, including Davidson at Michigan State University, feel this incongeniality is a provenance situation, that is the root system on which producers are trying to graft these hardy cultivars is adapted to the Pacific Northwest and not the Great Lakes States or other areas.

During the early development of these cultivars, incompatibility was not a problem because 90% of the trees were propagated and grafted on native seedlings by large local nurseries, e.g. Coles, and production was not concentrated in a small geographic area. However, with the advent of Lady Bird Johnson's Beautification of America campaign, rapid propagation and production of shade trees became paramount. At this point, production shifted to the Pacific Northwest where producers could more rapidly produce a

Continues on page 56

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straight liner. Since that time, incompatibility of scion and understock have become a problem, resulting in many landscape trees collapsing either soon after propagation or after reaching 3 to 4 inches in trunk diameter. Propagation by cuttage is one way to circumvent this problem.

Why haven't shade tree cultivars been propagated by cuttage in the past? The answer is tradition. Pomologists, specifically European, have grafted or budded apple trees for over 200 years. This tradition then inhibited change and/or research in new propagation techniques.

Recently Dow Gardens initiated research with the goal of propagating shade trees by cuttage. Working with several maple species (*Acer campestre, A. ginnala, A. platanoides, A. rubrum, A. saccharum nigrum*) two linden cultivars (*Tilia cordata* 'Greenspire' and *Tilia americana*), and several crab apple cultivars (*Malus*), we achieved 70 to 98% success.

We found that cuttings of *Acer rubrum* should be taken from spring wood that is no longer actively elongating (late May through mid-June). Usually these plants have completed their rapid growth (elongation) and lateral meristem or cambium seems more active, resulting in better rooting. Cuttings taken earlier in the season show a high tendency toward rotting. The cuttings are treated with Hormodin #3, placed in intermittent mist, and usually root within three to four weeks. Hedge Maple (*Acer campestre*), Amur Maple (*A. ginnala*), and Norway Maple (*A. platanoides*), lindens *Tilia c.* 'Greenspire' and *Tilia a.* 'Redmond,' and 'Snowdrift' Crab Apple were found to root successfully when taken during mid-July through early August. Coincidentally, this is a period of high cambial or meristem activity as reported by Hart and, again, Shigo. These rooted cuttings can be placed in cold storage or grown on and planted out the following spring. The most efficient production techniques must be worked out for each area.

Forestry has a similar problem. They must be researching ways to speed up their production cycle without increasing energy needs (pesticide application). This speed up in production cycle may be accomplished by accelerated growth of seedlings. Why seedlings? Seedlings remain particularly important as they provide genetic variation needed so that insect and disease control is not required or run rampant. Extensive disease and insect control on a scale required in traditional forestry would make the growing of trees almost prohibitory, be it for biomass, pulp, or lumber. New production techniques, resulting in 12 to 18 inch trees at the end of the first growing season, would greatly alleviate problems of the early years in establishment.

For northern areas, work by Hanover, Michigan State University, clearly has shown that accelerated growth concept can speed the production cycle. This accelerated growth is nothing more than using the inherent photoperiodic response (low energy). Plants are put under continuous light shortly after the seedlings germinate during the growing season, keeping them vegetative, i.e. in a state of almost constant cell division and elongation. Thus, we have seedlings 18 to 20 inches in height and ready for rapid establishment. The seedlings can be from collected sources which show genetic resistance or special environmental adaption needed for specific production goals. This combined with the abovementioned asexual propagation for urban trees could improve the quality while reducing maintenance costs of tomorrow's landscapes. One should expect to see only disease resistant crab apples, sycamores resistant to anthracnose, Shagbark Hickories tolerant of urban soil; further, readily-available plants which are easy to transplant yet are competitive with turf, e.g. Bur Oak and Shagbark Hickory. Some of today's dreams and needs will be available for tomorrow's landscapes because of this type of applied plant physiology or horticultural research. **WTT**

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Circle No. 123 on Reader Inquiry Card

GAIN SUPPORT FOR TREE PROGRAMS BY WORKING WITH LOCAL MEDIA

By Michael Scearce, consulting arborist, Baton Rouge, LA.

As city governments grind along toward providing their priority services, public tree care is often found at the bottom of the stack. Street repair, drainage, new construction, and refuse disposal are usually the top order of the day. However, as more and more of our urban trees tumble before the heavy equipment of progress the ones which remain gain in importance. The less there is of any one commodity, the more valuable it becomes.

The remaining public trees belong to the citizens; the voters. The liaison between the public and their trees is the municipal forester or city arborist and all too often one of his most powerful tools is neglected. That tool is not a spray rig or a power saw. It's the local news media!

Just as a chain saw performs best when well oiled, so does the public best support an urban tree care program when kept informed as to its problems and successes.

The municipal arborist will almost always find the local print and broadcast media eager to cover his story. In Baton Rouge, La. the city Beautification division has never had a public service announcement turned down. As a matter of fact, the accompanying photo was shot and donated free of charge by WAFB TV.

The media is, in essence, the private citizen's only means of keeping abreast of how his elected representatives spend his tax dollars. Regular monitoring of the city council can result in its becoming more responsive to the desires of those it represents.

In Baton Rouge, we have used the local media as a pry bar to lift the heavy lid of obscurity from municipal tree care. A regular weekly column I call "Out On A Limb" has been running in a local newspaper for a year and a half. The column approach provides continuous information about such topics as how trees function, what stresses occur in urban environments and how those stresses can best be dealt with. Pertinent do-it-yourself tips for the interested homeowner are well received, also. We have found that the better educated and more involved a person is concerning his own trees, the more interested he becomes in the health and appearance of his community's public trees.

> The more informed a person is, the more interested he becomes in community tree programs.

News coverage is not difficult to get. Support is largely derived from public knowledge of tree programs.

Occasional feature stories in local magazines or newspapers help acquaint readers with specific tree care programs, let them know what their urban forester is trying to accomplish, and most importantly, keep the concept of public tree care fresh in their minds.

Both print and broadcast media coverage are useful for "spot request" type stories. This can include the introduction of such programs as seasonal volunteering, neighborhood self-help projects, requests for the reporting of damaged or unhealthy public trees, summer watering of street trees, and requests for donations of seedlings or mulching materials. Response is sometimes overwhelming. One lady recently responded to our request in the local newspaper for winter mulch by donating 500 bales of hay!

Local T.V. and radio talk show hosts seem to be quite receptive to devoting shows to municipal tree care whether in the format of an interview with the city's tree specialist or having him/her field questions from the public by telephone. We are planning weekly radio call-in type shows with high expectations. A regularly scheduled local ½ hour home owner's T.V. show in Baton Rouge has expressed interest in doing a show concerning various aspects of public/private tree care, ordinances and legalities, and power line clearing problems.

Television public service announcements can be invaluable for rallying the public hue and cry over important tree care issues as they come up before the city council. In Baton Rouge, we have found that nothing elicits response from the public better than T.V. news coverage of a vandalized oak or the saving and transplanting of a mature Palm tree. **WTT**

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Circle No. 146 on Reader Inquiry Card

VEGETATION MANAGEMENT

By Roger Funk, Ph.D., Davey Tree Expert Co., Kent, Ohio

Q: *What herbicide(s) can we use to remove crabgrass from bentgrass greens which will not injure the bentgrass? (Tennessee)*
A: Pre-emergence herbicides such as Betasan can be used, but repeated use may reduce stress tolerance and increase disease incidence. Postemergence herbicides such as DSMA have also been used, but the potential for injury is high, particularly at high temperatures.

Perhaps the best solution is to remove the crabgrass by hand and improve the growing conditions to favor bentgrass growth.

Q: *At what height should bermudagrass be mowed on a football field, and when should it be cored? (South Carolina)*
A: Hybrid bermudagrass is mowed at one-half inch; common bermudagrass, at one inch. Core cultivation should be done after bermudagrass begins growth in the spring.

Q: *When is the best time to control oxalis?*
A: Any broadleaf weed can be controlled best when the weed is actively growing.

Q: *Is it possible for a tree to be injured by lightning and not have any external symptoms such as strips of bark burned or peeled off?*
A: Yes, internal tissues in the trunk and roots may be severely burned without external evidence. Symptoms of injury may not become apparent until several months after the tree is struck by lightning.

Q: *What precautions should be taken when using oil sprays? We burned some trees last year.*
A: Summer oils should have 85% of the unsaturated hydrocarbons removed; dormant oils, 65% to 75% of the unsaturated hydrocarbons removed.

Dormant oils should not be applied if the temperature is below 40°F. or will approach freezing soon after application. Some evergreens may show injury symptoms if freezing temperatures occur within three weeks following application. Dormant oils applied after October 1 may increase cold damage to some trees.

Summer oil may also cause injury if applied when the temperature is 90°F. or greater and should not be applied during hot, dry weather or when plants are stressed.

Oil sprays should not be used on sugar maples, hemlock, larch, cryptomeria, Japanese maples, beech, hickory, walnut, butternut, mountainash, redbud, coco palms and maidenhair ferns. Oil may injure Douglas fir flower beds and remove the blue color from blue spruce.

Q: *Can nematicides be applied by home owners or do they have to be applied by certified applicators? (Florida)*
A: Sarolex can be applied by home owners, but it will probably not give satisfactory control of lance and stubby root nematodes which can cause serious injury to turfgrasses.

Q: *How can we best maintain turf within student pathways that cut across campus? (New York)*
A: Students have a way of finding the most direct route between two points, which architects should consider when they include sidewalks in the design. Possibly the best solution would be to pave the paths. If this is not practical in your situation, shrubbery and certain ground covers can help direct foot traffic and confine it to existing walkways.

The primary problem with foot paths is compaction, which leads to turf thinning and potential erosion on slopes. Periodic aerification will help the turfgrass develop a deeper root system and increase resistance to wear. Higher mowing heights and high potassium levels also reportedly increase wear tolerance.

Q: *What herbicides will control the weeds that were controlled with Silvex?*

Are there other herbicides available to replace 2,4-D if it is removed from the market? (New York)
A: Dichlorprop (2,4-DP) in combination with 2,4-D will control many of the same weeds controlled by Silvex. Spurge can be controlled with DCPA and bromoxynil.

As an alternative to 2,4-D, MCPA is reportedly a viable substitute as are a few experimental compounds. However, I do not feel we should allow the 2,4-D turf registration to be cancelled without giving it a fair trial; I have yet to see any scientific data that supports the claims being made against it. Support the Professional Lawn Care Association of America's campaign to save 2,4-D. Their address is 435 North Michigan Avenue, Suite 1717, Chicago, Illinois 60611.

Q: *Where can I obtain a compound called Anhydrite? It is used as a soil amendment.*

A: Check with supplier of gypsum. Anhydrite is anhydrous calcium sulfate.

Send your questions or comments to: Vegetation Management c/o WEEDS TREES & TURF, 757 Third Avenue, New York, NY 10017. Leave at least two months for Roger Funk's response in this column.

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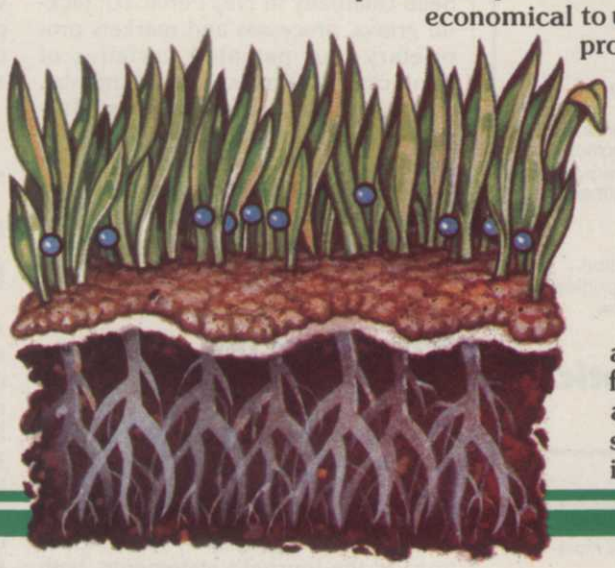

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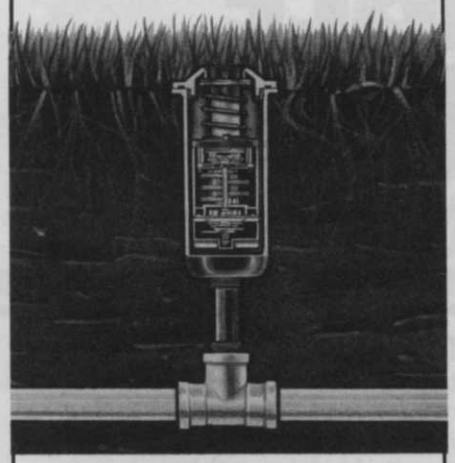

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Circle No. 150 on Reader Inquiry Card

SOD PRODUCER NEWS

Jacklin's acquisition fuels company's growth

The Jacklin Seed Company, a division of the Vaughan-Jacklin Corporation, continued its rapid expansion by acquiring certain assets of the Jenks-White Seed Company. Jenks-White reported more than $6 million in seed sales last year. This was the second sizable asset acquisition in two months for the Post Falls, ID, seed firm.

Jacklin's new facility, in Tangent, OR, will be operated as the Jenks-White division of Jacklin Seed Company. Jim Jenks, Howard Jenks and Dick Bailey of Jacklin's Salem, OR office, will manage the new division. The North Coast Seed Company and other related companies of Jenks-White Seed Company are not involved in the purchase.

Two months ago Jacklin acquired the operating facilities of the Gold Coast Seed Company in Nez Perce, ID. Jacklin grows, processes and markets proprietary and patented varieties of Kentucky bluegrass, environmental, reclamation and other grass seed. It is one of several divisions of Vaughan-Jacklin Corporation, a nationwide wholesale distributor, manufacturer and grower of professionally used horticultural products and home and garden supply items.

Word from the seed companies—

Lofts Pedigreed Seed says that two erroneous statements were included in the January-December (Volume 8) of the Official Journal of the USDA's Plant Variety Protection Office. Contrary to the journal's statements, both Baron Kentucky bluegrass and Ram I Kentucky bluegrass are fully protected turf varieties.

The company also states that its tall fescue, Rebel, will be used as 90 percent of the mixture in the new driving range built for the Congressional Golf Club, host of the Kemper Open. The remaining 10 percent was Baron Kentucky bluegrass.

Jacklin Seed says that perennial ryegrass has come a long way in the past ten years from its use in pastures to fine turf areas. It is not only beautiful but quite winter hardy and almost as widely adapted as Kentucky bluegrass. Whatever way perennial ryegrass is used, the versatility of the new varieties such as Jackpot, Citation, and Elka guarantees good results with so little bother that lawn making and repair requires little effort, says Jacklin.

The company also announces purchase of the Nez Perce, Idaho, operating facilities of Gold Coast Seed Company Officials at Post Falls, ID, Jacklin's headquarters, said it would be operated as a department of that division. Jim Henderson, currently the general manager of Nez Perce, will continue in this capacity for Jacklin.

International Seeds is now marketing 'Scenic' Kentucky bluegrass *(Poa pratensis)*, which is hardy, grows and spreads rapidly, and has about the same density as Merion. It is slighty less prostrate in growth habit than Merion, with finer leaves and darker green leaf color. It holds its green color well even under conditions of low soil fertility, and it is quite drought tolerant.

Television viewers exposed to sod, promotion

Approximately 120 public television stations broadcast a sod installation demonstration in early July. The segment was part of a Public Broadcasting System television series "This Old House," which describes all the phases involved in restoring a house.

The half hour episode was mostly concerned with landscaping and had a seven minute segment detailing the installation process and informing the viewers about the instant beauty of sod. Chris Beasley, of Tuckahoe Turf in Rhode Island installed the sod and explained how sod ties in with landscaping in general.

The American Sod Producers Association helped promote the show and encouraged local ASPA member to advertise in their local newspapers and television guides.

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on the south wall is minimal, so a roof overhang will do a better job than a shade tree of keeping the direct sunlight from entering the home. If a tree is used, it should be deciduous, so the sun can shine through the branches in winter.

4. Vines are an alternative to shade the walls of a home. They can grow directly on brick walls, but for frame houses they should be grown on trellisses to protect the wall surface from moisture damage. Trellisses should be removable so the wall can be reached for painting when needed.

5. The north wall of a home seldom needs shading but may need wind protection in the winter. An evergreen windbreak is usually recommended because it doesn't lose its leaves in winter. The zone of protection is 20 times the height of the plants; thus, a 10-foot-high evergreen windbreak will screen the wind for 200 feet.

6. Where space won't permit an evergreen windbreak, use a slat—not solid—fence. A solid fence creates high-pressure effects that make the wind more vicious. A slatted fence slows down the wind, allowing some air to penetrate.

7. An alternative to a fence is an earth berm, a contoured mound of earth, that can be used to channel and direct the wind. Berms are best used during the construction of a new home, before the site has its grading finished.

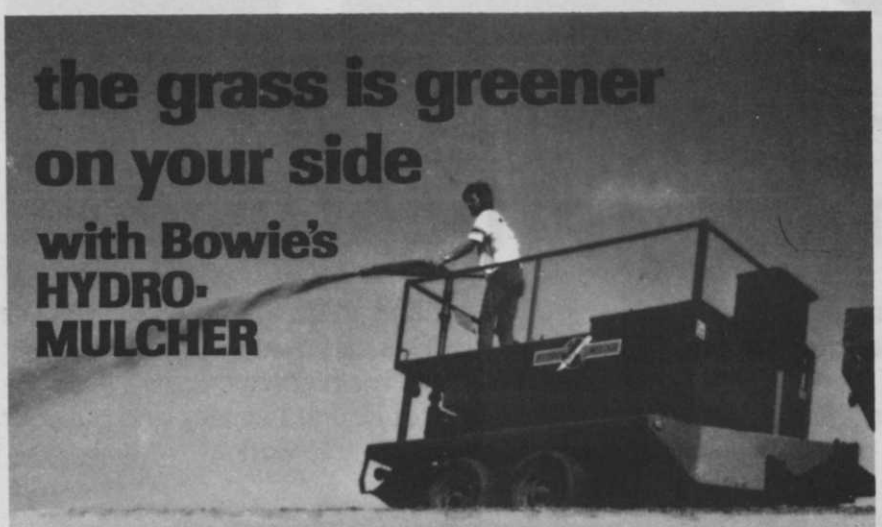
8. Lawns can be effective in reducing air temperature. Grass is 10 to 14 degrees cooler than exposed soil. During the summer, exposed soil near a house will retain radiated heat, thus interfering with cooling.

9. Be careful in using gravel, stone, and paving materials. Gravel and stone mulches, for instance, retain heat and should not be used close to the home. Asphalt also retains heat. Wood, concrete, and brick do not retain as much heat and so are better suited for use close to the house.

10. For additional cooling of a home in summer, plantings on the south and west sides will help. They cool the air while channeling it through open doors and windows.

More detailed information is available in a pamphlet called "Designing An Energy-Efficient Home Landscape" (Circular 1178) by William Nelson Jr., extension landscape architect, Cooperative Extension Service, College of Agriculture, University of Illinois, Urbana-Champaign, IL.

University and industry leaders in horticulture were initiated as honorary national members into Pi Alpha X, a fraternity of floriculturists and landscape and ornamental horticulturists. From left to right are: Dale Kester at Cal Poly-San Luis Obispo. Davis, CA; Henry Mollgaard, Snohomish, WA; Robert Weidner, Encinitas, CA; and George Oki, Sacramento, CA.



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COMPANY NEWS

Janke, Cosper, Rackley, Shepersky

E.P. Janke has been appointed president of Gravely Division of McGraw-Edison in Clemmons, NC. Janke, who has 30 years experience in the outdoor power equipment industry, replaces James Fischer, who has been promoted to vice president, Planning and Development, Commercial and Industrial Group, McGraw-Edison Company, at the corporate headquarters in Rolling Meadows, IL.

Also in North Carolina, Thomas C. Cosper, Jr., has been named director, Lawn/Garden, for the Homelite Division of Textron Inc., Charlotte. Cosper, who has been regional sales manager, North, since 1977, will assume overall marketing responsibility for Homelite's new lawn/garden operation organized following the merger of all consumer products from the Jacobsen Division of Textron Inc.

Anderson H. Rackley has been named business manager of phenoxies

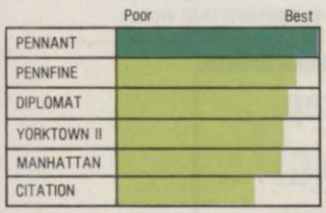
Continues on page 66

What do turfgrass experts say about Pennant* ryegrass?

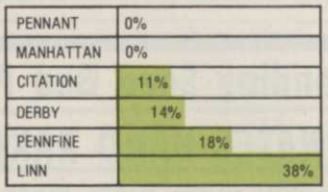
The Turf Trial results speak for themselves. **Pennant** is a champion. Rigidly controlled, comparative testing involving **Pennant** and competing varieties of perennial ryegrasses were conducted by turf experts across a broad region of the U.S.—the Pacific Northwest, the Southwest, the Northeast.

Pennant topped many of its competitors in these tests, including overseeding and heat tolerance trials in the Southwest. Some of the expert's findings are illustrated below.

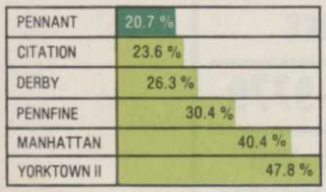
Warm and cool season average turf score, Southern California first-year tests, 1979.



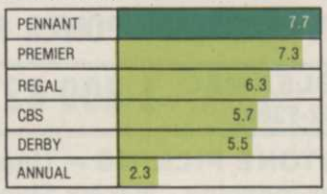
Percent winter injury. Adelphia, N.J. March 1978. (10 of 26 varieties tested showed no significant injury.)



Pennant was best among 12 varieties tested for red thread disease (Corticium fuciforme) in 1-year average, 1979-80. Western WA. (Low score = Best).

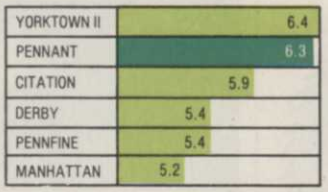


Average Turf Performance scores, February 1980. Southern Arizona turf overseeding on Tifgreen Bermuda. Sixteen entries seeded October 1979. (10 = Best).

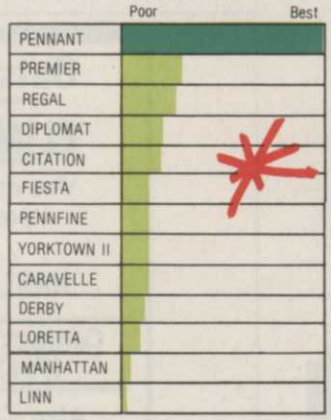


* Plant variety protection pending and anticipated

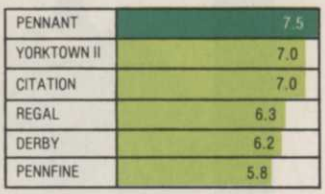
Turf performance scores. North Brunswick, N.J. 1975-78. (9 = Best).



Pennant was best among 57 varieties tested for sod webworm tolerance (lawn moth - Crambus spp. of the order Lepidoptera), Adelphia, N.J., August, September, October 1980.



Reaction to brown patch disease (Rhizoctonia), Adelphia, N.J., 1978. (9 = least damage)



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Circle No. 148 on Reader Inquiry Card

News *from page 64*

for the Agricultural Chemicals Division of Diamond Shamrock Corporation. As a result of the recent acquisition of the Fallek-Lankro Corporation's phenoxy herbicide plant in Tuscaloosa, AL, Diamond Shamrock is now putting increased emphasis on its phenoxy business.

In addition to Rackley's promotion, Diamond Shamrock also announced that Dr. Leonard L. Welch has been promoted to the position of business manager of herbicides and Ted L. Kabat has been named as product manager.

Keith Shepersky, formerly district manager for Rain Bird Sprinkler Mfg. Corp.'s western Turf Sales Division, has been appointed manager of training and marketing services for the Turf Division. In his new role, Shepersky will take responsibility for technical and product educational training programs and the development of sales supporting product comparison and feature benefit presentations.

Mallinckrodt, Inc. has announced that William W. Rhymes, sales executive for its Specialty Chemicals Division, will concentrate his activities exclusively on the specialty agricultural segment of the Division's business.

James R. Coson, president of Royal Coach/Buckner, announces personnel changes and expanded production facilities for the Fresno, CA-based manufacturer of sprinklers, valves, and automatic controllers. Vince Nolletti has been appointed vice president of the company. Nick M. Dvorak has become vice president, sales and marketing.

First Readex Award is presented to P.B.I. Gordon Senior Vice President A.T. Pambechy (center) by Jim Brooks, national sales manager of Weeds Trees & Turf. On the right is Charles Eatough, agency representative for Gordon and creator of the advertisement that won.

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TREE FARM BUSINESS MANAGEMENT
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A guide to help you increase profits from tree farming. Major problems confronting large and small tree farms and how to meet them including recommendations for seeking out accountants, lawyers and other professionals. **$20.50**

GUIDE TO TREES
by Simon & Schuster
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MODERN WEED CONTROL
by Alden S. Crafts
Deals exhaustively with the botany, chemistry, plant physiology and ecology involved in modern weed control technology. Contains lists and classifications of herbicides and an abundance of illustrative material that will help the reader visualize the varied aspects and forms of weed control. **$16.00**

DISEASES OF SHADE TREES
by Terry Tattar
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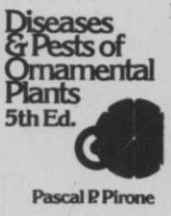

DISEASES & PESTS OF ORNAMENTAL PLANTS
by Pascal Pirone
This standard reference discusses diagnosis and treatment of diseases and organisms affecting nearly 500 varieties of ornamental plants grown outdoors, under glass or in the home. Easy to understand explanations of when and how to use the most effective fungicides, insecticides and other control methods. **$26.50**

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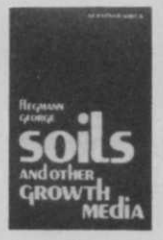
The fourth edition of this guide for anyone involved in the care and treatment of trees. Special sections on tree abnormalities, diagnosing tree troubles, non-parasitic injuries and assessing the suitability of different trees. **$27.50**



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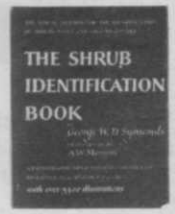

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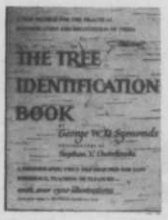

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EVENTS

The current issue of WEEDS TREES & TURF carries meeting dates beginning with the following month. To insure that your event is included, please forward it, 90 days in advance, to: WEEDS TREES & TURF Events, 757 Third Ave., New York, NY 10017.

International Society of Arboriculture Convention, Boyne Mountain Resort, Boyne Falls, Michigan, **Aug. 9-12.** Contact E.C. Bundy, ISA, PO Box 71, 5 Lincoln Square, Urbana, IL 61801, (217) 328-2032.

Central Plains Turf Foundation/ Kansas State University Turf Field Day, Manhattan, KS, **Aug. 12.** Contact Dr. Robert Carrow, Kansas State University, Dept. of Horticulture, Waters Hall, Manhattan, KS 66506, 913/532-6170.

Maine Nurserymen's Association summer meeting, Western Maine Forest Nursery Co., Fryeburg, ME, **Aug. 12.** Contact Rick Churchill, Executive Secretary, Plant & Soil Dept., S.M.V.T.I., So. Portland, ME 04106, 207/799-7303.

Residential Landscape Design Course I, Marriot North, Dallas, TX, **Aug. 12-14.** Contact ALCA, 1750 Old Meadow Road, McLean, VA 22102, 703/821-8611.

Massachusetts Nurseryman's Association summer meeting, Stewart's Nursery, Turners Falls, MA, **Aug. 19.** Contact Deborah Fanning, Executive Director, Massachusetts Nurseryman's Association, 715 Boylston Street, Boston, MA 02116.

Irrigation Association of New Jersery 7th annual field day, Reed's Sod Farm, Princeton Pike, Princeton, NJ, **Aug. 20.** Contact Linda Errickson, Administrator, P.O. Box 138, Dayton, NJ 08810, 201/329-6003.

American Association of Botanical Gardens and Arboreta midwest chapter, Dow Gardens, Midland, MI, **Aug. 20-22.** Contact The Dow Gardens, 1018 W. Main St., Midland, MI 48640, 517/631-2677.

Dollar Management Seminar, Executive Inn, Seattle, WA. **Aug. 21-22.** Contact ALCA, 1750 Old Meadow Road, McLean, VA 22102, 703/821-8611.

International Garden Centre Congress, Disneyland Hotel, Anaheim, CA, **Aug. 24-30.** Contact Pat Redding, GCA, 230 Southern Bldg., Washington, DC 20005.

Grower's Tour, Aug. 25. Contact Richard Staples, Program Administrator, California Association of Nurserymen, 1419 21st Street, Sacramento, CA 95814, 916/448-2881.

Southern Containerized Forest Tree Seedling Conference, Hyatt Regency Hotel, Savannah, GA, **Aug. 25-7.** Contact Dick Guldin, Southern Experimental Station, USDA Forest Service, 2500 Shreveport Highway, Pineville, LA 71360.

USDA Turfgrass Research Field Day, Beltsville Agricultural Research Cen-

Continues on page 72

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ter-West, Beltsville, MD, **Aug. 26.** Contact Jack Murray, USDA-SEA-BARC, Bldg. 001, Rm. 333, Beltsville, MD 20705, 301/344-3655.

University of Rhode Island Turfgrass Field Day, Kingston, RI, **Aug. 26.** Contact C.R. Skogley, University of Rhode Island, Dept. of Plant Science, Woodward Hall, Kingston, RI, 02881, 401/792-2570.

Northern Michigan Turf Managers Association meeting, Acme, MI, **Sept. 15.** Contact C. E. "Tuck" Tate, President, NMTMA, 1147 Santo, Traverse City, MI 49684, 616/947-9274.

Ornamentals Northwest Seminars, Oregon State University, Portland Memorial Coliseum Portland, OR, **Aug. 28-29.** Contact Dr. James L. Green, Oregon State University, Dept. of Horticulture, Corvallis, Oregon 97331, 503/754-3464.

Farwest Show, Memorial Coliseum, Portland, OR, **Aug. 28-30.** Contact Dan. O. Barnhart, Show Manager, Farwest Show, 0224 S.W. Hamilton, Portland, OR 97201, 503/221-1182.

ILD Interior Landscape Conference, Hyatt Hotel, Atlanta, GA, **Sept. 9-12.** Contact ALCA, 1750 Old Meadow Road, McLean, VA 22102, 703/821-8611.

Michigan State University Turfgrass Field Day, Robert W. Hancock Turf Research Center, East Lansing, MI, **Sept. 10.** Contact Dr. John Kaufman, Department of Crop and Soil Sciences, Michigan State University, East Lansing, MI 48824, 517/355-2033.

Oregon Association of Nurserymen Annual Convention, Kah-Nee-Ta Lodge, Warmspring Indian Reservation, OR, **Sept. 10-13.** Contact Dan O. Barnhart, Executive Director, Oregon Association of Nurserymen, 0224 S.W. Hamilton, Portland, OR 97201, 503/221-1182.

Garden Industry of America Conference & Trade Show, Pittsburgh Convention/Exposition Center, Pittsburgh, PA, **Sept. 10-12.** Contact GIA, Box 1092, Minneapolis, MN 55440.

Alabama's Annual Turfgrass Conference, Auburn, AL, **Sept. 14-15.** Contact K. M. Sheffer, Extension Hall, Auburn University, AL 36849, 205/826-4985.

International Garden Trade Fair, Cologne, Federal Republic of Germany, **Sept. 13-15.** Contact Koln Messe, Messeplatz, Postfach 21 07 60, 5000 Koln 21, Federal Republic of Germany, Telex: 8 873 426 a mua d, Telegram Address: INTERMESS Koln, Telephone: (O221) 821-1.

Tree Foreman Training, Kent, Ohio, **Sept. 14-25.** Contact Richard Abbott, Davey Environmental Services, 117 S. Water St., Kent, OH 44240, (216) 673-9511.

Northern Michigan Turf Managers Association meeting, Acme, MI, **Sept. 15.** Contact C. E. "Tuck" Tate, President, NMTMA, 1147 Santo, Traverse City, MI 49684, 616/947-9274.

Virginia Tech Turfgrass Field Days, Blacksburg, VA, **Sept. 15-17.** Contact Dr. John Hall, 421 Smyth Hall, Virginia Tech, Blacksburg, VA 24061, 703/961-5797.

International Exhibition of Groundsmanship, Royal Windsor Racecourse, Windsor, Berkshire, England, **Sept. 15-17.** Contact Institute of Groundsmanship, P O Box 243 (Wolverton), Milton Keynes, Buckinghamshire MK12 2YG England.

National Lawn and Garden Distributors Association annual conference, Opryland Hotel, Nashville, TN, **Sept. 15-18.** Contact Nancy Irving, NLCDA, 1900 Arch St., Philadelphia, PA 19103, 215/564-3484.

Management Information System Seminar, Los Angeles, CA, **Sept. 16-17.** Contact ALCA, 1750 Old Meadow Road, McLean, VA 22102, 703/821-8611.

Management Information System Seminar, Executive Inn, Seattle, WA, **Sept. 18-19.** Contact ALCA, 1750 Old Meadow Road, McLean, VA 22102, 703/821-8611.

Living Plant Growers Association Annual Foliage Seminar, Queensway Hilton, Long Beach, CA, **Sept. 22.** Contact Lanny Walker, LPGA, 1419 21st Street, Sacramento, CA 95814, 916/448-2898.

Pacific Horticultural Trade Show, Long Beach Convention Center, Long Beach, CA, **Sept. 23-25.** Contact Lanny E. Walker, California Association of

Continues on page 74

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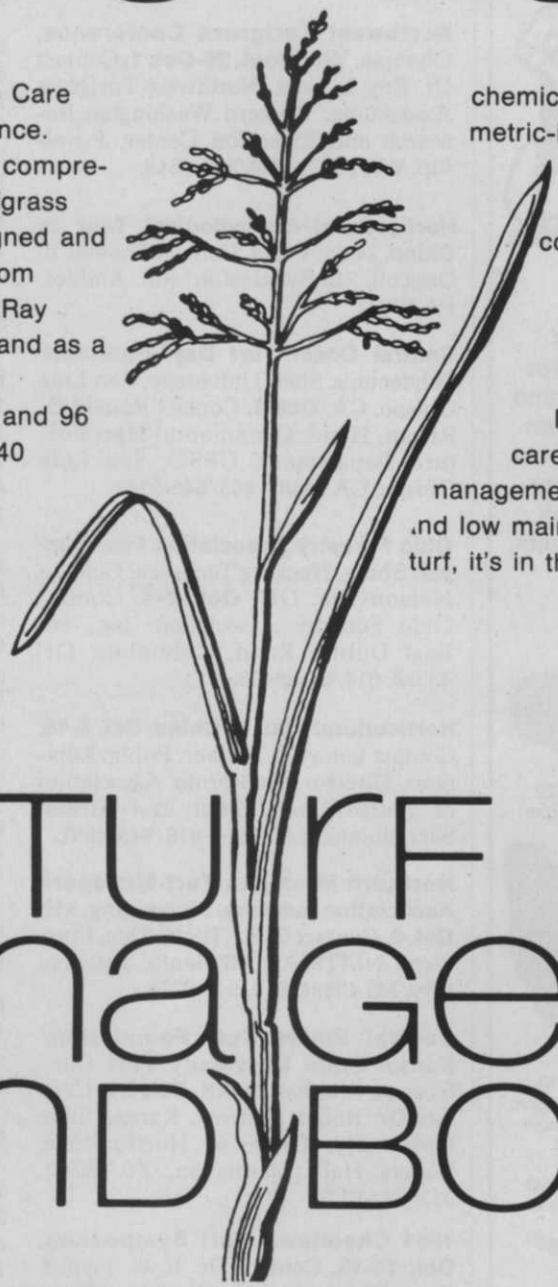
The book contains 150 illustrations and 96 color photographs. Data includes 240 tables and forms. Included are specifications for rootzones, employment, calculations for chemical applications, and extensive metric-imperial conversion. Business and technical aspects of turfgrass management are covered in this 424-page book. Planning, purchasing, hiring, construction, and plant selection are put together for easy on-the-job reference. Markets covered include lawn care, sod production, golf course nanagement, cemeteries, athletic fields, .nd low maintenance areas. If it concerns turf, it's in the Turf Managers' Handbook.



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Events *from page 72*

Nurserymen, 1419 - 21st Street, Sacramento, CA 95814, 916/448-2881.

Northwest Turfgrass Conference, Olympia, WA, **Sept. 28-Oct. 1.** Contact Dr. Roy L. Goss, Northwest Turfgrass Association, Western Washington Research and Extension Center, Puyallup, WA 98371, 206/593-8513.

Horticultural/Archaelogical Tour to China, 24 days, **Oct.** Contact Thomas R. Driscoll, 718 Swedesford Rd., Ambler, PA 19002.

Central Coast Turf Day, California Polytechnic State University, San Luis Obispo, CA, **Oct. 1.** Contact Ronald D. Regan, Head, Ornamental Horticulture Department, CPSU, San Luis Obispo, CA 93407, 805/546-0111.

Ohio Forestry Association Paul Bunyan Show, Hocking Technical College, Nelsonville, OH, **Oct. 2-4.** Contact Ohio Forestry Association, Inc., 665 East Dublin Road, Columbus, OH 43329, 614/846-9456.

Horticultural Tour to China, Oct. 5-18. Contact Lanny E. Walker, Public Relations Director, California Association of Nurserymen, 1419 21st Street, Sacramento, CA 95814, 916/448-2881.

Northern Michigan Turf Managers Association meeting, Pinconning, MI, **Oct. 6.** Contact C. E. "Tuck" Tate, President, NMTMA, 1147 Santo, Traverse City, MI 49684, 616/947-9274.

Central Plains Turf Foundation/ Kansas State University Turf Conference, Manhattan, KS, **Oct. 6-8.** Contact Dr. Robert Carrow, Kansas State University, Dept. of Horticulture, Waters Hall, Manhattan, KS 66506, 913/532-6170.

1981 Chemlawn Turf Symposium, Oct. 14-15. Contact Dr. B. G. Joyner, Plant Diagnostic Lab, Chemlawn Corporation, 6969 Worthington-Galena Road, Suite L, Worthington, OH 43085.

Southern California Turfgrass/ Landscape Equipment & Material Educational Exposition, Costa Mesa, CA, **Oct. 14-15.** Contact Ed McNeill, Southern California Turfgrass Council, 1000 Concha Street, Altadena, CA 91001, 213/798-1715.

Southwest Turfgrass Association Annual Conference, Albuquerque, NM, **Oct. 15-16.** Contact Arden Baltensperger, Southwest Turfgrass Association, New Mexico State University, Agronomy Dept., Box 3-Q, Las Cruces, NM 88003, 505/646-3138.

International Society of Arboriculture, New England Chapter, Annual Meeting, Sheraton-Wayfarer Inn, Bedford, NH, **Oct. 18-20.** Contact Oscar Stone, Editor, 84 Daniel Drive, New Haven, CT 06513.

Florida Turf-Grass Association 29th Annual Conference and Show, Orlando, FL, **Oct. 18-22.** Contact Beth Eyman, FTGA, 1520 Edgewater Drive, Suite E, Orlando, FL 32804.

New England Chapter International Society of Arboriculture Annual Meeting, Sheraton Wayfarer Inn, Bedford, New Hampshire, **Oct. 18-20.** Contact Oscar Stone, 84 Daniel Drive, New Haven, CT, 06513.

1981 National Safety Congress, Fertilizer and Agricultural Chemical Section, Blackstone Hotel, Chicago, IL, **Oct. 19-22.** Contact G.E. Harlan, Corporate Manager of Safety, Indiana Farm Bureau Cooperative Association, Inc., 120 East Market Street, Indianapolis, IN 46204, 317/631-8361.

California Association of Nurserymen Annual Convention, "Seaside Celebration," Ventura Holiday Inn, Ventura, CA, **Oct. 20-22,** Contact Program Administrator Richard Staples, C.A.N. Office, 1419 21st St., Sacramento, CA 95814, 916/448-2881.

Planning & Budgeting Seminar, Executive Inn, Seattle, WA, **Oct. 23-24.** Contact ALCA, 1750 Old Meadow Road, McLean, VA 22102, 703/821-8611.

Interior Plantscape Association Third Annual Conference & Trade Show, Radisson Hotel, St. Paul, MN, **Oct. 28-30.** Contact IPA National Headquarters, 11800 Sunrise Valley Drive, Reston, VA 22091, 703/476-8550.

Professional Grounds Management Society Annual Conference and Trade Show, Marriott Hotel, Portland, OR, **Oct. 31-Nov. 4.** Contact Allan Shulder, Executive Director, Professional Grounds Management Society, 7 Church Lane, Pikesville, MD 21208, 301/653-2742.

Professional Grounds Management Society Annual Conference and Trade Show, Portland, Oregon, **Nov. 1-5.** Contact Allan Shulder, PGMS, 7 Church Lane, Pikesville, MD 21208, (301) 653-2742.

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Conwed® Hydro Mulch 2000 fibers were **six times more effective** in controlling erosion than other fiber mulches in an impartial university test. That could mean six times more protection for your investment in seed, fertilizer, and labor, so you can minimize costly post-job repairs and redos.

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PRODUCT	"APPARENT" EROSION RATE (Soil Loss) Pounds/Minute*	Equivalent Tons/Acres/Hour
CONWED HYDRO MULCH 2000 FIBERS Mulch applied at 1600 pounds per acre	0.14	2.35
AVERAGE OF OTHER MULCHES Mulch applied at 1600 pounds per acre	0.96	16.08
BARE SOIL (control plot)	1.99	33.34

*Testing was done on a **2:1 slope.** After soil preparation, the plots were seeded and mulched in one operation and allowed to lay overnight. Simulated rain controlled at the rate of four inches per hour was applied until a targeted deterioration of the surface occurred. Product effectiveness was evaluated by "apparent" rate of erosion which was calculated by dividing the total time until deterioration by the weight of the material eroded.

This natural wood fiber mulch is **premixed** with a highly effective soil stabilizing tackifier for convenient **one-step application.** It's ideal for hydraulic seeding everything from front lawns to strip mines. And, once it's down, Hydro Mulch 2000 fiber enhances germination by protecting seeds from temperature fluctuations and evaporation of soil moisture.

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For information, write Conwed Corporation, Fibers Division, 444 Cedar Street, P.O. Box 43237, St. Paul, Minnesota 55164. Or phone (612) 221-1190.

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Athletic *from page 44*

Vented Field Covers

Raising the temperature of the interface between the cold air above and the warm soil below may greatly improve the rate of turfgrass growth under marginal weather conditions. Vented field covers made of clear plastic sheeting (¼ inch perforations spaced 6 inches apart) have proven useful in increasing the temperature below the interface. These covers are easy to apply, can be left on the turf for long periods of time, and allow rain to enter the rootzone. The covers can increase the growing season by 30-60 days in late fall and early spring.

Numerous "raincoat" coverings have been used to protect soil from excess rainfall prior to game time. However, moisture tends to condense under the surface of the solid plastic sheets which results in a wet playing surface, and any holes or loose edges that allow the entry of rain water tend to cause excessively wet spots. Further, the heavy covers require considerable manpower and time to spread.

At least 16 of the major stadia in Sweden have powered rollers by which the plastic field covers are removed. These are stored within one section of the soccer fence during the games and throughout the summer months. A plastic covering used for this purpose may last three to six years, depending on the ultraviolet light inhibitors incorporated. Plastic sheeting, without perforations, must be removed during bright warm days to prevent killing of the turfgrass.

Covers reinforced with nylon or of other woven fibers provide increased strength and resistance to tearing. Experience with plastic sheets perforated at 2, 6, and 8 inch intervals indicates that the 6 inch spacing is most satisfactory. The 6 inch perforations allow some venting, permit water to enter and reduce the adverse effects of wind on the large sheets.

Colorants

Latex based colorants are widely used on athletic fields. The white spray paint has largely replaced the lime dusts for official line markings. The logos of teams and stadia are emblazoned in colors in the endzones. The sidelines are color coded for player information. Entire fields (especially those of dormant bermudagrass) have been sprayed green. Green sawdust has been added to bare areas for color effect. Entire fairways have been sprayed prior to television coverage of winter golf. Home lawns of zyosia or bermuda are sprayed in the fall following the first frost, then retouched in early spring for added color.

Trade names of turfgrass colorants on the market include Everbright, Greenstuf, Greenzit, Sta-Green, Stayz-Green, Vichem Green, Vitalon dark—zoysia, Vitalon light—bermuda, and Winterlawn. **WTT**

Birka boots the competition in the transition zone.

Birka's kicking up quite a fuss with attractive appearance, low maintenance and consistent hardiness in Kentucky bluegrass adaptation areas of the U.S. This dark green, narrow-leafed variety overcomes adversity without dominating the mix. Birka is ideal for use in Maryland and Virginia.

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BANVEL plus 2, 4-D is a versatile combination you use anytime from early spring to late fall. It kills by penetrating both leaves and roots, so weeds can't come back.

Mixes quickly, stores well. Use it according to directions, and your weed worries are over for the year.

Ask your Velsicol distributor about BANVEL 4S, too. Or write Velsicol Chemical Corporation, 341 E. Ohio Street, Chicago, IL 60611.

Before using any pesticide, read the label.

Velsicol

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Circle No. 157 on Reader Inquiry Card

WT&T PRODUCTS

Three-week control of disease is now possible with Subdue 2E from Ciba-Geigy. It will control pythium blight in established turf when applied as a preventative treatment at a rate of 1-2 ounces in 3-5 gallons of water per 1,000 square feet. In newly seeded areas,

Subdue will control pythium damping off and pythium blight with the same amount in 5-10 gallons of water. One use is ryegrass overseeding on bermudagrass greens for transition. Research for the product was performed by Houston Couch of VPI, Blacksburg.

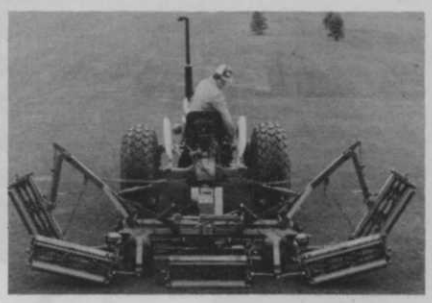
Circle No. 166 on Reader Inquiry Card

Amdro fire ant insecticide achieves up to 90 percent kill of the dreaded fire ant when applied at the recommended rates. The insecticide, developed by American Cyanamid Company, has received EPA registration for use on pasture and range grass, lawns, turf and non-agricultural land. Amdro is still undergoing tests for residue in crops.

Amdro is a slow-acting stomach insecticide, formulated on a corn grit using soybean oil as the bait, which attracts the fire ants. It works by becoming part of the ant food chain when carried back to the colony by worker ants. Either mound-to-mound or broadcast application is acceptable, but not more than 1½ lbs. of Amdro should be applied per acre. Amdro is now available in 1 lb. and 25 lb. packages.

Circle No. 167 on Reader Inquiry Card

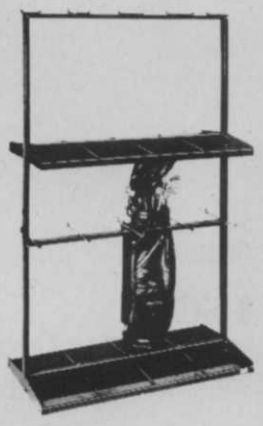
Hydraulic lift PTO mowers from Brouwer Turf Equipment Limited mow evenly and provide a smooth and even grass finish. They eliminate tractor



wheel marks and reduce mowing frequency. Available in three, five, and seven gangs, all pieces can lift together. Mowers adapt to any tractor equipped with external hydraulics.

Circle No. 168 on Reader Inquiry Card

Continues on page 82



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Circle No. 140 on Reader Inquiry Card

Products *from page 78*

Front mounted flail mowers by Vemco in 48″ and 60″ widths have been released. These new additions to the line, powered by a front P.T.O. or electric clutch P.T.O., have 360° front mounted

caster wheels which allow easy turning and mower height adjustment.

There are three different blade styles—rock dodger, fine cut, and dethatching—to choose from.

Circle No. 169 on Reader Inquiry Card

Banol Turf fungicide, which showed highly effective Pythium blight control when tested on turfgrass, is now available for professional use on golf courses and lawns as the result of an EPA approved Experimental Use Permit. Marketed by TUCO Agricultural Chemicals, a division of the Upjohn Company, Banol Turf fungicide is a water soluble liquid concentrate with Propamocarb hydrochloride as its active ingredient.

Approved label use includes application of 1.3 to 4 oz. of Banol in 2-5 gal. of water per 1,000 sq. ft. as a preventive treatment when weather conditions favor development of Pythium blight. A repeat application may be made in 7-21 days if weather conditions remain favorable for disease development.

Circle No. 170 on Reader Inquiry Card

Tandem-drive utility truck from West Point Industries will haul payloads as large as 1,200 pounds. The A-500 Utility Master has a 27 cubic foot bed and a tandem drive that delivers power through all four rear wheels. An 8 h.p. engine, equipped with electric starter, alternator, and 12-volt battery, powers the little truck.

Continues on page 85

BUILT STRONGER TO LAST LONGER.

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Circle No. 149 on Reader Inquiry Card

Big mover?

Looking for a machine that can make the big delivery for your tree-moving operations . . . up to 8″ diameter trees? You can dig them with the new TS-84 Tree Spade from Vermeer. It's the largest tree-moving machine in the Vermeer line. Digs a gigantic 84″ diameter tree ball, down to 54″ deep. Over 8,000 lbs., transplanted in minutes! And, the best part? It's a one-man operation. Six powerful "spades" lift both tree and root ball hydraulically. Ideal for developers, landscapers, large nurseries.

Too much machine for your operation? Vermeer makes four other models — on truck, tractor or trailer mountings — to fit your tree moving or "tree packaging" operations. Ask your Vermeer dealer for a demonstration today.

VERMEER TS-84 TREE SPADE: Digs tree ball 84 inches diameter, 54 inches deep. Hydraulic Controls. Self-locking rear assembly. 91-inch transport width.
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The hauler is highly maneuverable with a single front wheel and small overall dimensions. The turning radius is just 8 feet and the A-500 can slip through spaces as narrow as 58 inches.

Standard features include variable speed automatic transmission, disc brakes, a parking brake, welded all-steel frame, and steel box bed with exterior plywood inserts. Options for the A-500 include a selection of flat bed, dump bed, let-down metal loading ramps, lights and turn signals.

Circle No. 171 on Reader Inquiry Card

Quick-mount scoop options are now available with the Piggyback Material Handler by Princeton Manufacturing Company. The optional hydraulic or mechanical scoops have a 15 cu. ft. bucket capacity and are sturdily built with hardened, abrasive-resistant steel. The hydraulic scoop is apron mounted and recommended for more difficult or prolonged jobs. Special quick-mount hydraulic adaptors allow complete attachment in less than ten minutes. The mechanical scoop can be apron or fork mounted. Fork mounting

can be accomplished in a matter of seconds. Powders, scrap, sand, loose soil, chemicals and other bulk materials can be handled with the scoop, making the Piggyback forklift quite flexible.

Circle No. 172 on Reader Inquiry Card

Utility Scoop attachment for Excel's Hustler grounds maintenance tractors can carry up to 600 pounds of materials when used on 1981 Hustler tractors, with the exception of the model 261, which can carry 300 pounds. The Scoop is 60-inches wide with a 3/16 inch-steel scrapper blade that can be replaced easily. Volume of the scoop is 11.2 cubic feet.

The scoop is easily attached and adjusted to the tractor's "quick hitch" tool bar. Moving a clevis pin on the dump arm tube adjusts bucket curl. The operator controls the scoop using two levers to the right of the seat. An attachment lift lever is used to hydraulically raise or lower the scoop. The auxiliary hydraulic valve control lever is used to tilt and dump the bucket.

Drive wheel steering allows for operator control, and the weight of the machine is centered over the drive wheels to enhance ground traction. The scoop can be used for dirt, snow removal, grain, fertilizer, mulch, debris, or other material handling.

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LETTERS

Tree injection rebuttal

Dr. Funk's reply to "Pennsylvania" (WTT, June, 1981) reflected a narrow, misleading, uninformed view of Mauget injections. None of the "data" Davey refers to has been published, has it?

1. Mauget has advocated for the past two years in the N.E. the use of a *predrilled injection site* (11/64" diameter 3/8" deep into the xylem) as preferred to the insertion tool method of injection as demonstrated by published data (J. of Arbor. 6 (8) 1980).

2. Mauget for the past three (3) years had *NOT* advocated "trunk injection" but rather *Rootflare Micro-injection* sites. There is a vast difference. These data have been published (J. of Arbor. 6 (8) 1980).

3. The "distribution and uptake" of chemical by 40 psi method is *not* advocated by many scientists. We do *not* require more than 6-8 psi in the Mauget system to achieve very satisfactory "distribution and uptake."

4. Mauget has had EPA label expansion for the use of Inject-A-Cide B to effectively manage the Bronze Birch Borer in Birch in the N.E. since 1978. Its continuing studies with dogwood borer are most encouraging as are studies with scales. They anticipate label clearance for both of these pests.

5. Dr. Funk failed to respond to the reader's question concerning "convenience" and "expense." There is no more "convenient," safe, labor efficient technology than the Mauget method. Relative to costs — my results with the Mauget Stemix-Hi Volume fertilizer via rootflare micro-injection average one third (⅓) *LESS* than conventional "soil fertilizing." Biological efficacy obtained is superior to conventional fertilizing especially with urban trees.

In Davey's "continuing research" on "trunk injections" I would strongly urge them to evaluate the Mauget technology modified to use a drill and making injection sites in the root-flare of the tree. Davey has the opportunity to refute the above statements or at the very least to move into a fuller understanding of the changing world of "tree injection" to allow better balanced answers to your readers.

Sincerely yours,
Arthur C. Costonis, Ph.D.
Systemics, Inc.
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Continues on page 88

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